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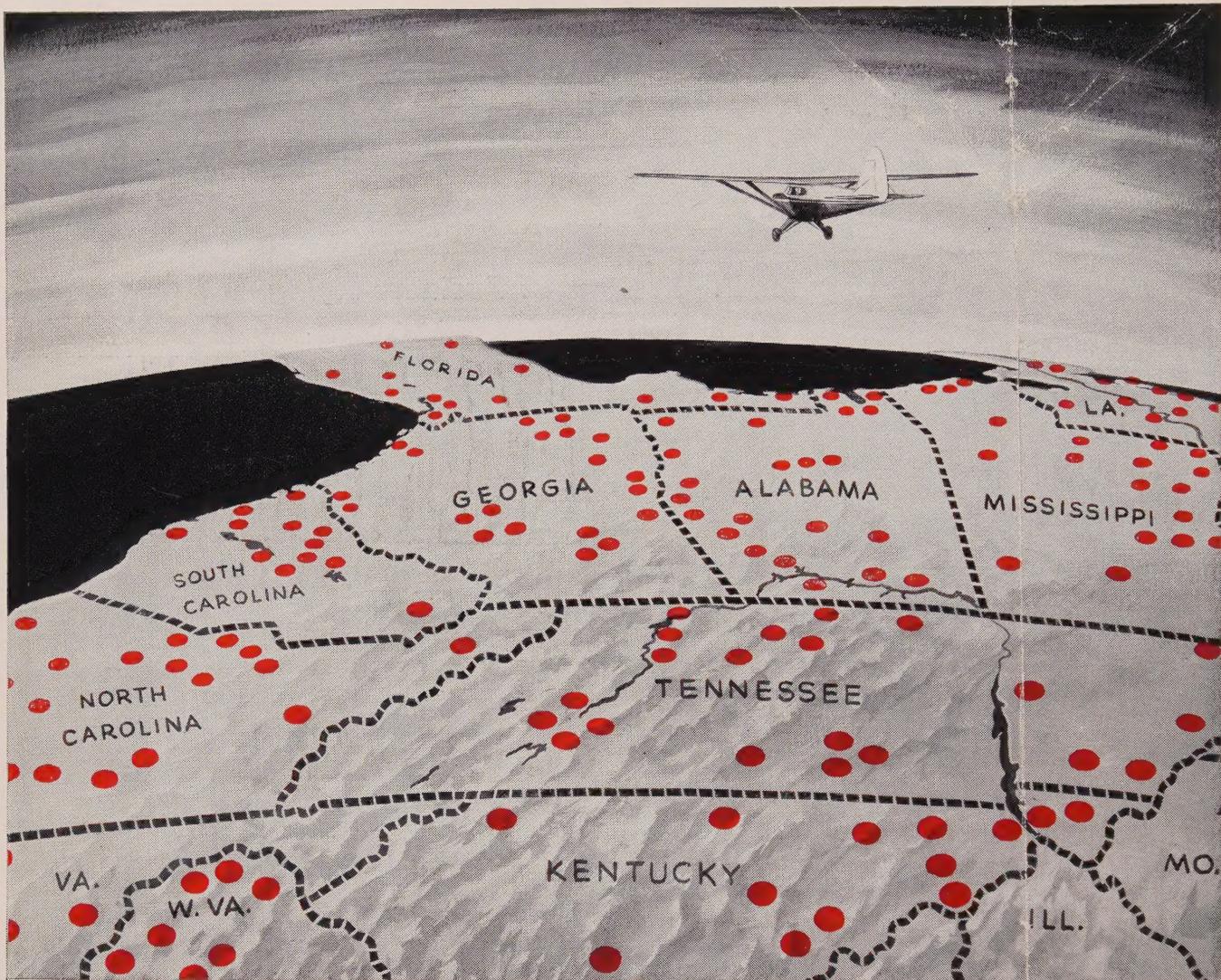
Skyways

JUNE 1956

The Pioneer Publication of Business Flying



- Flight Operations Round Table: Crash Rescue Protection
- Business Aircraft Pay Profitable Dividends
- Pilot's Report: The Royal Gull ■ Lateral Diversion Explained



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Skyways

The Pioneer Publication of Business Flying

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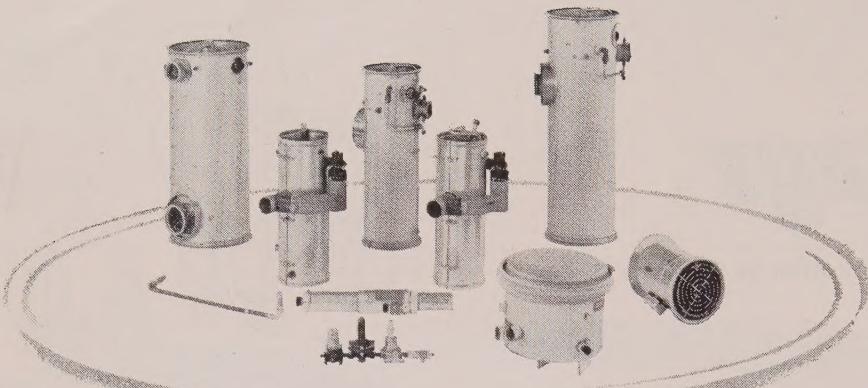


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PERSONNEL

Dr. Erwin O. A. Naumann, for 10 years an Air Force consultant at Wright Air Development Center, is new chief of advanced studies in Solar Aircraft Co.'s engineering division.

Alfred E. Lewis was named industrial relations manager of Curtiss-Wright Corp.'s research division, Quehanna, Pa., recently and **C. P. Chesley** was appointed to the same position in the industrial and scientific products division, Caldwell, N. J.

Louis Fahnestock recently became director of projects administration for Fairchild Aircraft Division, Hagerstown, Md.

William Sieber, senior design engineer since 1954 for Weber Aircraft Corp., recently moved to staff engineering supervisor of the commercial seat division.

Richard Hodgson was named executive vice president of Fairchild Camera and Instrument Corp., following **John M. Case's** resignation. Hodgson joined Fairchild Camera last year.

Edgar B. Franklin is the new deputy regional CAA administrator at Honolulu. He has been chief of the air-carrier safety division in Washington since 1947. He is a 19-year CAA veteran.

John L. Whiteman has been appointed as manager, technical advertising and data department, Jack & Heintz, Inc.

John B. Ward is now sales manager of the new products division of the Corning Glass Works, Inc.

Fred H. Steuber recently moved to field service manager for aircraft engines operations at the Allison Division of GM.

Frank H. Squires is Topp Industries, Inc.'s new director of quality control. Squires was formerly quality control manager at Lear, Inc.

Will W. White, 25-year veteran in the aviation fuel and lubricants field has been elected a vice president of Esso Research and Engineering Co.

Donald S. Conrad has been promoted to chief installation engineer at Pratt & Whitney Aircraft. He has been with the company since 1940.

Charles L. Johnson, 23-year Lockheed Aircraft Corp. employee, has been appointed to a newly-created company position, vice president for r & d.

Stewart S. Knapp, formerly a street lighting engineer for the Connecticut Light & Power Co., has joined the power and aviation section of AGA division, Elastic Stop Nut Corp. of America.

George W. Wimberly is new central Florida manager for Riddle Airlines, Miami, Fla. He was formerly Riddle's Tampa station manager. Also, **Frederick R. Merritt** became an administrative assistant to Riddle Airlines' vice president for sales, Charles L. Hood.

S. Albert Lazoni recently joined the Decker Aviation Corp., Philadelphia, Pa., as assistant to the president in charge of engineering, research and development.

A. A. Pieper, accounting consultant, has moved to the position of controller of Servel, Inc., from Republic Aviation Corp.

(Continued on page 38)

industry notes . . .

■ The free world's countries continue to show a marked preference for American-built planes. The most recent AIA statistical report shows that during March, 1956, U. S. exports of civil planes weighing 6,000 pounds or less increased more than 36% over the average monthly export rate for 1955. Companies reporting March shipments were Aero Design and Engineering Co., Beech Aircraft Corp., Cessna Aircraft Co., Piper Aircraft Corp., and Taylorcraft.

■ The business aircraft industry scored a record first quarter for the 1956 calendar year with a total of 1,658 units being delivered by the four major manufacturers of business utility planes. The record marked a 54% increase over the 1955 first quarter. Cessna Aircraft led the industry with 848 units delivered.

■ R. P. Bowman, president of R. P. Bowman Co., Oakland, Calif., Northern California and Western Nevada Cessna distributor, has sold the company's assets to Henry von Berg, widely-known California aircraft businessman.

■ Lear, Inc., Santa Monica, Calif., has set up two operating companies abroad in support of its expanded European operation. They are a Swiss subsidiary, Lear, S.A., in Geneva, and a German subsidiary, Lear Electronics, GmbH, at Reim near Munich.

■ The Federal Aid to Airports Program for 1956 exceeds in matching funds for airport development the total made available in any single year since Congress passed the Federal Airport Act of 1946. Under provisions of Public Law 211, passed last July to amend the Federal Airport Act of 1946, the sponsors of public airports may plan to receive in aid during each of the next three fiscal years \$63,000,000, less certain administrative expenses. Meanwhile, a CAA 5-Year Plan for orderly development of new air navigation and traffic-control facilities—including 69 long-range radars and 383 more omniranges—is under study by Congressional money committees.

■ The Hertz Corp., Chicago, recently acquired Carey Driv-Ur-Self, Inc., largest car-rental firm in the New York metropolitan area and one of the largest independent rental companies in the United States. New Hertz airport facilities acquired include concessions at La Guardia, and Idlewild Airports, and at the East and West Side Airlines Terminals.

■ Lopez-Grace Aviation, Inc., a new commercial aircraft sales and service organization, Miami International Airport, has been named Florida distributor for Beech Aircraft Co. A branch facility of the new firm will be located at Broward County International Airport, Ft. Lauderdale, Fla.

■ Marking the first time that a major air-freight carrier company has been named to such membership, the Flying Tiger Line has been elected to membership in the Air Transport Association.

■ Bell Aircraft Corp.'s helicopter division, Ft. Worth, Tex., delivered 28 new Model 47 helicopters to 20 operators in a recent slightly-over-a-month period. Among the new owners are Aero Boeing, Seattle; Wiggin's Airways, Norwood, Mass.; Petroleum Helicopters, Lafayette, La.; Colorado Interstate Gas Co.; Smith-Pace Pipeline Construction, Camp Hill, Pa.; Skymotive, Chicago; Frederick Matthaei, Detroit; and Fruehauf Trailer Co., Detroit.

■ Aircraft Engineering Foundation president, Monte H. Sneiderker, and his staff recently told the Foundation's members—who own and operate over 100 C-46 planes—and the public that AEF's Super C-46 has finally received a CAA certificate. At the same time, AEF announced the transfer of its Los Angeles office to Meacham Field, Ft. Worth, Tex., where more adequate facilities are expected to provide increased service to members, the public, and civil aviation authorities.

■ The Garrett Corp., Los Angeles, has opened new offices for its Aero Engineering division in Detroit and Cincinnati.

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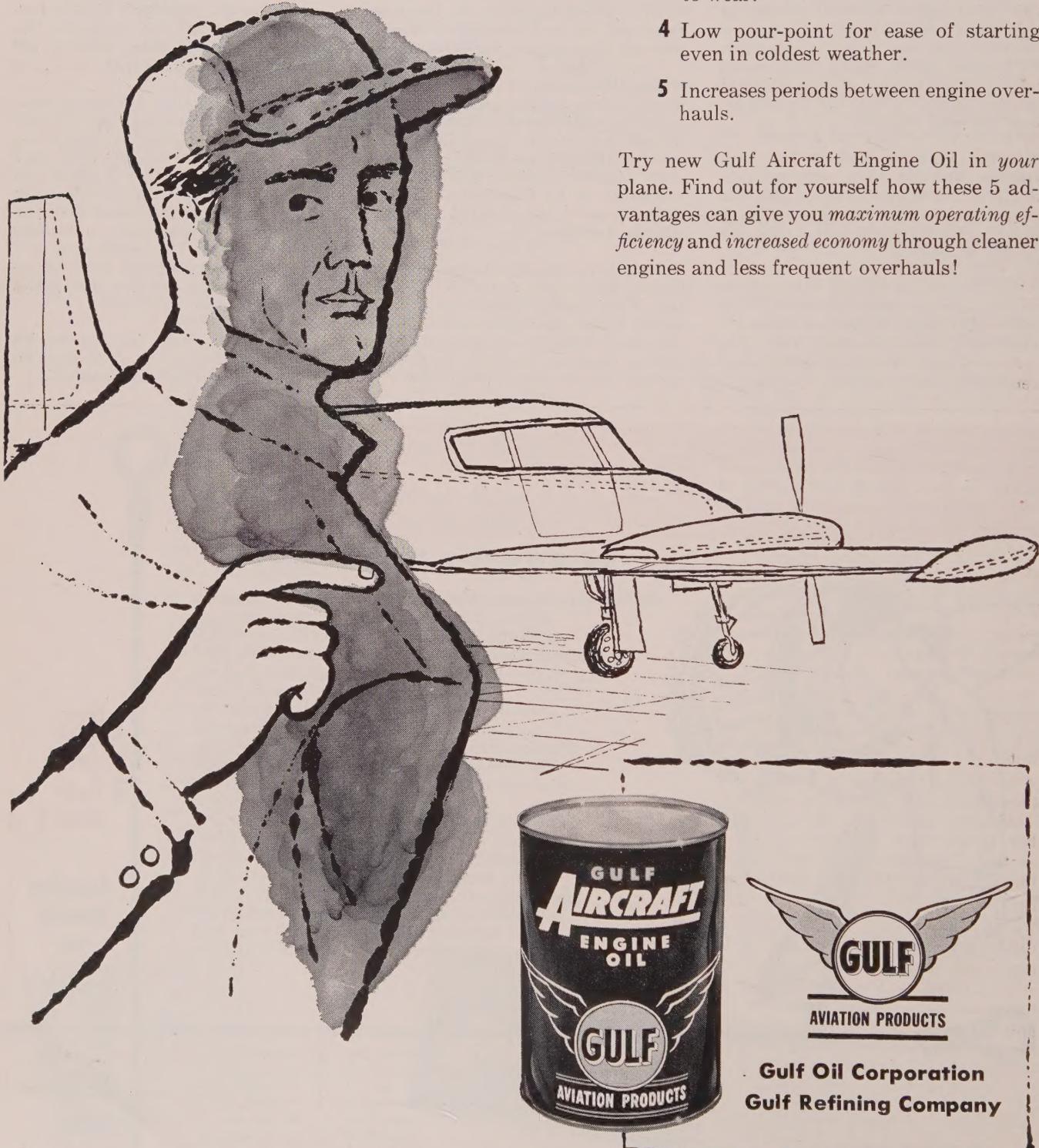
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LATERAL DIVERSION

by Robert K. Polson, *Executive Pilot*

..(Author Polson has prepared three related articles: "Lateral Diversion," "Windstream Analysis For Pressure-Pattern Flight" and "Minimum-Time Track Construction." They will appear in next two consecutive issues of SKYWAYS.—Ed.)

The ability of airborne radar to define local storm centers creates a new degree of safety, comfort, and speed in the operation of low-altitude aircraft. The subject of lateral diversion, including efficient track patterns, methods of computing increased distance, associated ATC problems, and the practical ranges of operation should be of interest to every pilot. Increased route distances for well-planned circumnavigational tracks is, in many cases, offset by the higher airspeeds possible in smooth air. The long-range aspects of lateral diversion serves as an introduction to pressure-pattern flight, which is discussed in subsequent paragraphs of this article. The advantages resulting from weather and wind diversions enables a very favorable comparison of low-altitude aircraft operation to that of costlier, pressurized equipment.

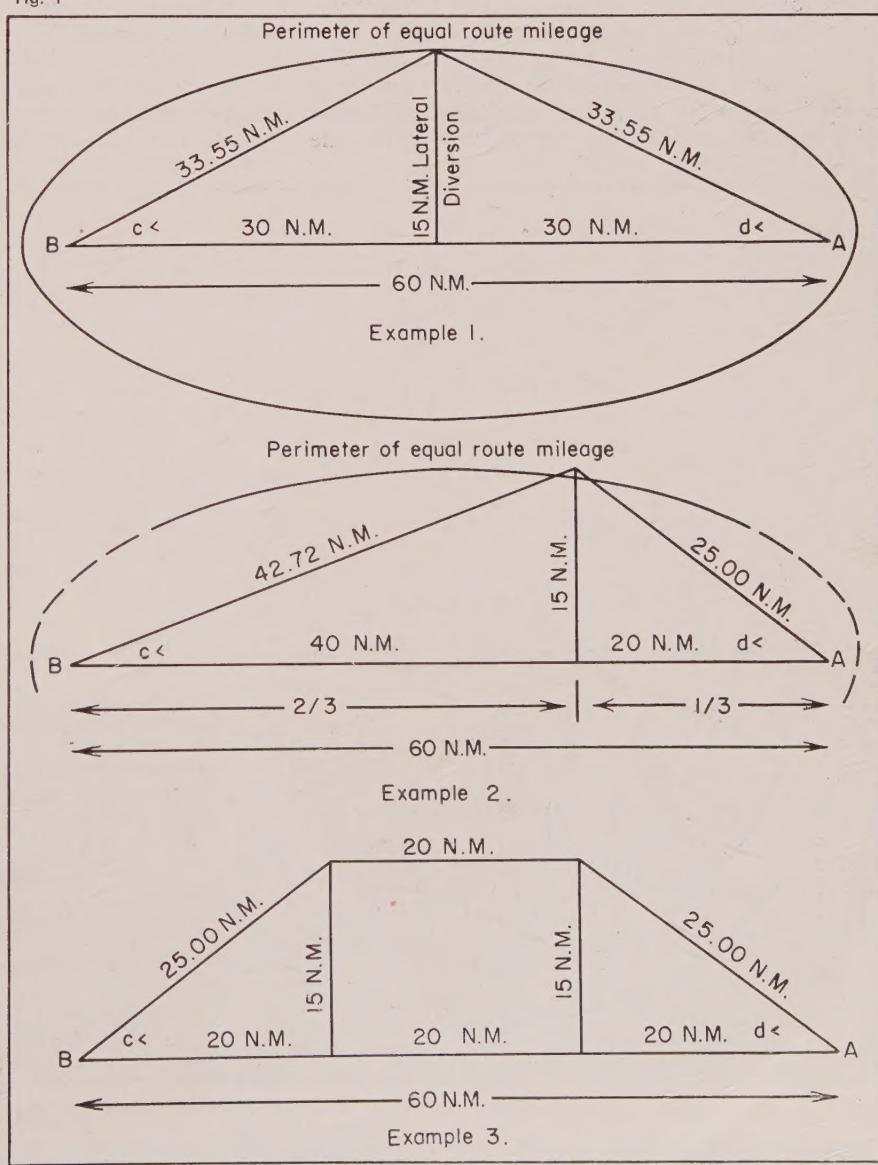
A perimeter of equal-route mileage may be drawn between any two points by establishing an inelastic string between the points, lengthening the string by the desired increase in miles, securing with thumb tacks at the terminal points, and drawing the resulting ellipse by taking up the slack in the string. This forms a locus of equally-increased route distance on both sides of the direct track, the two sections of the taut string forming the possible diversionary track patterns. This ellipse contains an infinite number of triangles, whose base represents the direct route, whose combined other two sides exceeds the base by the given mileage increase, and whose height represents the diversion distance measured perpendicular to the direct route. The maximum possible diversion distance will occur at the route mid-point, as shown by example 1 of figure 1. The curvature of the perimeter of equal route mileage in relation to example 1, as compared to example 2, indicates that little difference in route mileage will occur should the same diversion distance be made effective at any point in the

middle one-third portion of the route. The error induced by assuming identical length has been calculated not to exceed 1.5% of the correct overall mileage at a probable maximum diversion distance equal to 40% of the direct route mileage. This relationship will deteriorate, and the combined hypotenuse mileage begin to increase, as the diversion erection is moved further towards the route terminals. Curved tracks, closely approximating these triangular tracks, will also be virtually identical in length. The most efficient diversions will therefore fall within this central portion of the route. All following

Fig. 1

references to specific diversion distances, are intended to fall within this area. Within these limits, and for all symmetrical patterns similar to example 3, the route mileage increase is equal to twice the hypotenuse of the appropriate right triangle.

This increase may be readily solved on the E6 series Dalton computers by treating speed lines as distance, and drift angles as departure angles relative to the direct track. The solution of the right triangle of example 1, is illustrated in figure 2, using a line through the cardinal points as a 90° reference. All distance values may be reduced by any common multiple to



fit within the computer limits, i.e.; the 15-mile diversion may also be read as 150 miles etc. The departure angle will remain unchanged.

Any departure from the airway limits on an IFR flight plan, involves a check on terrain height, and cooperation with ATC. Traffic control requires an adequate description of the diversionary track, and a revised ETA based on the increased distance. The proposed track may be conveniently expressed in terms of the point of departure and return to the airway limits, and the proposed miles off the original route at a given point, or may be expressed geographically. "Due thunderstorm ahead," usually gets a prompt, affirmative reply.

A long-distance diversion around an entire weather system, or for a minimum-time track, must comply with local ATC departure and arrival procedures, except under unusual local weather conditions. Between these areas of local control, a diversionary track may either ease or complicate traffic control, depending on the amount of traffic, the location of major holding areas enroute, and the direction of preferential traffic flow. A high degree of familiarity with the route is necessary to avoid conflict with pre-committed traffic. Air route

traffic control bulletins usually state that the center will clear aircraft on the preferential route, unless the pilot determines that deviation is necessary because of one of the following conditions existing along the standard route: (1) Adverse weather conditions, such as icing, turbulence, thunderstorms, strong headwind components, etc., (2) Inoperative radio aids; or (3) Atmospheric or precipitation disruption of communications, or of reliable reception of radio navigational transmissions.

The responsibility for weather diversion, and for determination of adequate fuel reserves for any given routing, is placed on the shoulders of the pilot. Where failure to secure a given routing might adversely affect the safety of the flight, the appropriate reason should be clearly indicated to ATC. Direct communication by telephone, at the earliest possible time, will eliminate misunderstanding.

The increased mileage incurred over the previously-described diversion patterns has been calculated by trigonometric functions, as shown by figure 3 (page 40), to accurately illustrate the practical distances and departure angles for efficient diversionary tracks. Complete circumnavigation of enroute weather, at a reasonable in-

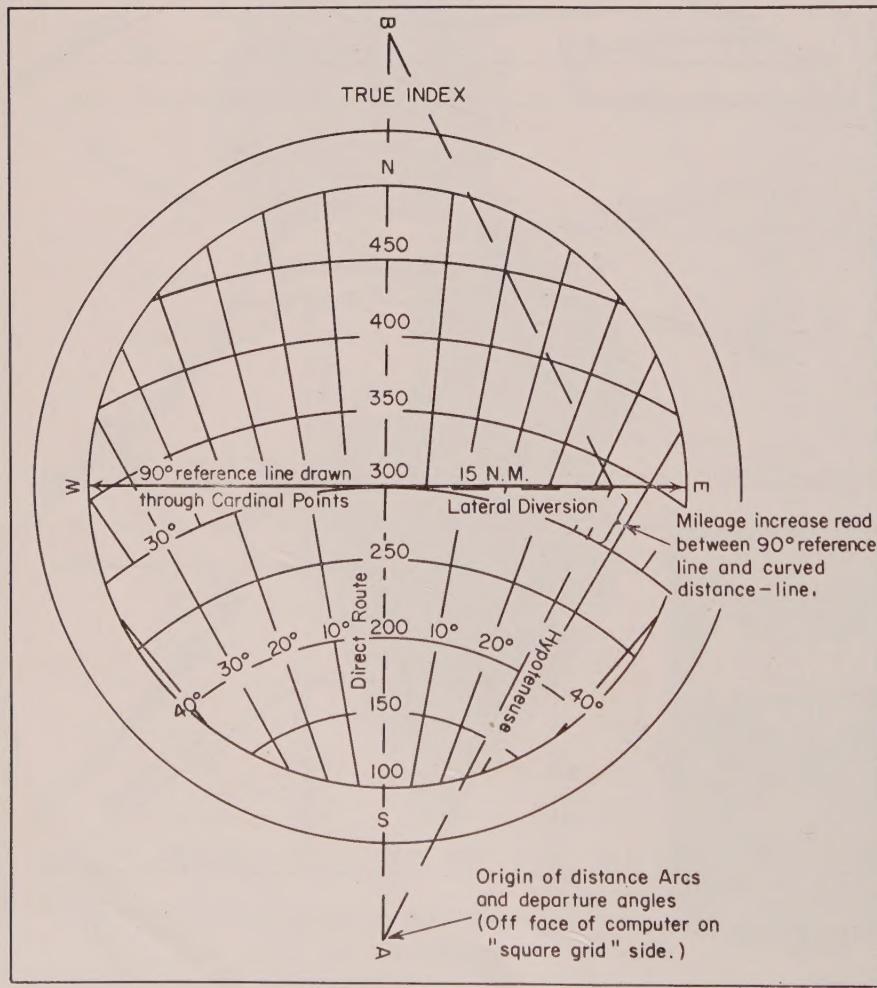
crease in flight time is often possible, for example; a detour of 100 miles-off for a 600 mile flight, increases total mileage by $32\frac{1}{2}$ miles. Similarly, a typical loss of 35 air-miles due to turbulence on the preferential route between New York and Chicago, would permit a diversion over Buffalo to escape such conditions, *with no increase in flight time*. The approximate time loss of 4 minutes for a 50 mile diversion over a 500 mile route, is ample reason in this era of overburdened control facilities, for cooperative acceptance of minor ATC routing revisions without protest. Increased mileage is a function of the departure angle, and the lesser angles, made possible by an early diversion, are indicative of efficient routings. Diversion at angles approaching 90° represents a complete loss in time for the distance flown in that direction. Any new system of airway route structure should eliminate this undesirable possibility, through implementation of flexible, omni-directional airways.

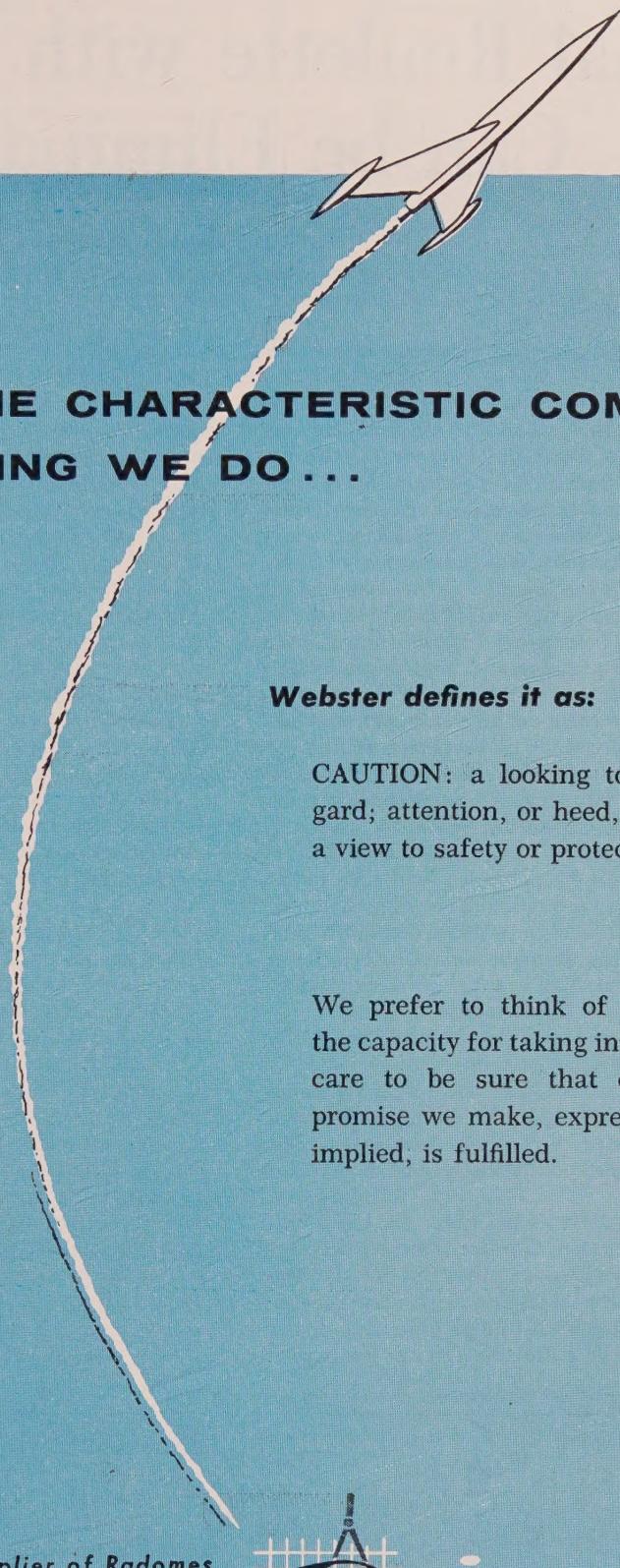
Flight over a minimum-time track is a form of lateral diversion, conducted to achieve a wind advantage which more than offsets the accompanying mileage increase. Under such conditions, the practical diversion distances increase quite rapidly, extending outwards, in some cases, to a mileage equivalent to 40% of the direct route mileage. The *break-even difference* in wind component required for a diversionary track, may be roughly determined from figure 3, by dividing the approximate direct route flight time into the proposed mileage increase. Flight to a point 150 miles removed from an 850 mile direct track, would require a wind advantage of 10 knots over a period of 5 hours in order to break-even. A larger advantage than 10 knots would result in reduced flight time. *The relatively small increase in required wind component for departure angles of less than 30° - 35° , is the basis for minimum-time track feasibility.* This relationship is not easily overstressed.

Pressure-pattern flight originated with pressurized, high-speed aircraft operating over long oceanic routes. Except for jet stream interception, the elements of high-altitude, and high-speed are disadvantages to pressure-pattern utilization. *The structure of upper air pressure distribution is such that desirable, sharply defined changes in wind direction occur more frequently at the lower levels as compared to altitudes flown by pressurized aircraft.* The mechanics of distance, wind, and time favor a slower aircraft. This can be illustrated in a hypothetical problem, by comparing

(Continued on page 40)

Fig. 2





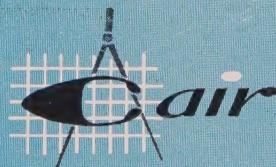
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Aerial Roulette with the Boss Can be Eliminated

by Captain Chuck Banfe

Pan American World Airways

The executive flying industry has exploded into a billion-dollar giant.

Last year more air miles were flown by executive flight crews than by all of the U.S. scheduled airlines. The executive industry owns 10 times the number of aircraft that all of the U.S. scheduled airlines possess. More than 23,000 executive planes flew bosses all over the world last year, and aviation experts forecast 50,000 business aircraft by 1965. William P. Lear, board chairman of Lear, Inc., thinks that figure is too small. He foresees 80,000 business aircraft by 1965 and if Lord Byron's statement of many years ago, "The best prophet of the future is the past," is true, a backward glance shows that the executive aircraft field has tripled in the last nine years!

The future success of executive air transportation depends primarily on improvements in safety. Although there has been a notable success in the operating record of the executive aircraft industry, the performance must be maintained in this coming period of rapid growth if the industry is to be assured.

There is, of course, some disagreement in regard to the best methods of achieving this goal. New executive aircraft will be taxing the pilot to the hilt—his reaction time—his ability to learn—his judgment—his desire to learn—and his comprehension. It will require more than a log-book filled with time.

Some believe that pilot responsibility can be reduced by means of special devices such as aids to flying and by improved automatic pilots. But, the record last year of civil aircraft accidents pinpointed pilot error as the cause of many mishaps, so more believe that greater attention should be directed to better methods of hiring and training flight personnel.

The pilot is lord and master of his craft. On his shoulders rests the decision whether the aircraft shall take off or land, whether maintenance requirements make the flight operable or not. The passengers are his bosses.

The need is greater today for good executive pilots than ever and might well be extremely critical tomorrow.

The pickings are getting threadbare, for the Korean War did not shake loose a tremendous flow of trained pilots. In the next decade, executive aviation may be relegated to the CPT days of hiring. Companies will have to hire thin logbooks and train their own men.

The Army Air Force was faced with a similar problem in 1941. President Roosevelt asked for the first 60,000 planes of a force soon to become 300,000. The Army had to find men to fly them—quickly and effectively. Because of the huge number of pilots needed, a better system of selection to replace the old, was high priority.

Before World War II, the requisites for a pilot candidate were courage and desire. Bitter experience taught the folly of any such assumption. No more do all individuals have the aptitude for flying than do all persons possess the know-how for art, music, tournament tennis, four-minute-mile, or the other accomplishments to which few attain.

The Army tapped Dr. John Flanagan on the shoulder to solve the problem. He was then psychologist for the testing service of the American Council on Education.

He quickly saw the only way to get the answer to "What makes a good pilot?" was to find out "What is a good pilot?" Through study and research of the Army's best fliers he discovered that, instead of two traits, courage and desire, the best fliers were molded of 20 distinct traits.

Ability to reason, skill at mathematics, a wide vocabulary, all are fine for IQ but just scratch the surface of what makes a good pilot. With a group of recruited professors and psychologists he worked out a battery of tests to go far deeper than any tests had ever done, for airmen.

The series were called *Stanine Tests*.

The applicants were graded on a STAndard NINE, as to probable success. The tests took 10 hours to complete and covered reaction time, judgment and planning, instrument interpretation, mechanical relations, experience, instrument reading, coordination, orientation, personal history, attitude, interest, and movement visualization.

The tests proved remarkably successful.

The highest grade was *Stanine 9* and the lowest was

Fig. 1

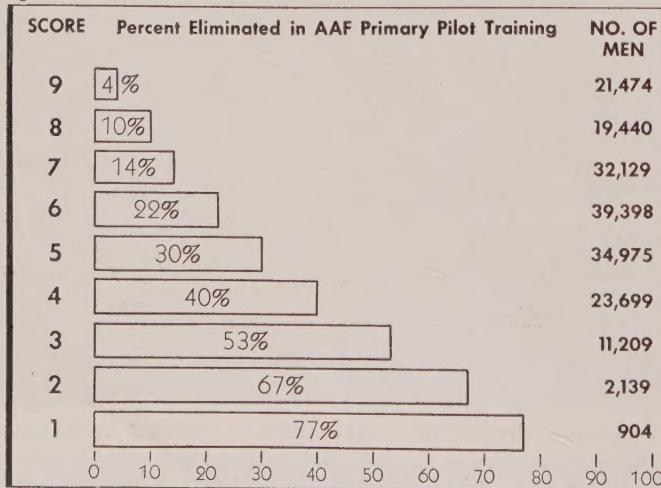
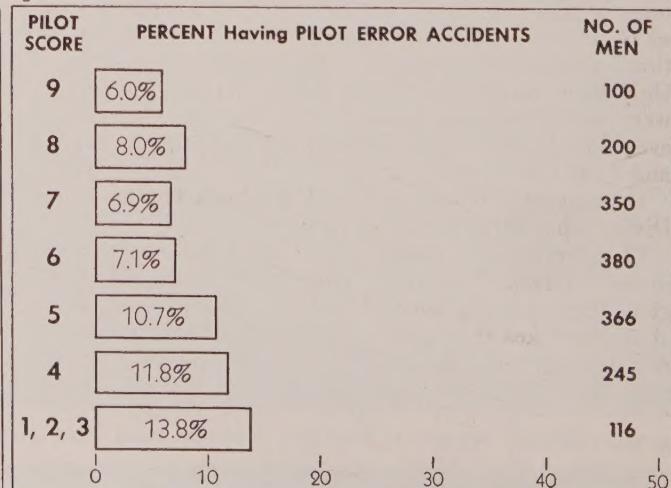


Fig. 2



Stanine 1. Only 4% of those AAF cadets in the top *Stanine* group failed and 77% of those in the bottom *Stanine* group were "washed out." (Figure 1.)

Before the war ended, Dr. Flanagan had successfully tested more than *one million men!* Of this group more than 500,000 were assigned to flight training. Of those found fully qualified on physical examination and educational requirements for flying duty, nearly 200,000 were disqualified on the basis of low *Stanine*. (Figure 2.)

The system was so satisfactory that the RAF and French Air Force adopted the *Stanine* Tests in 1944.

After the War, Dr. Flanagan organized the American Institute for Research (AIR) in Pittsburgh. It was and is a *non-profit* organization devoted to the scientific study of human resources and their effective use. Its first chore was to tailor the AAF studies to the commercial pilot.

The difference between the requirements for a good military pilot and a good commercial pilot were small. With the cooperation of major airlines, new tests were tried out and revised. They were then offered to the airlines. Follow-up studies of on-the-job performance have been collected and periodic revisions have kept the tests up-to-date and further sharpened their ability to distinguish between men with high pilot potential and those who are not likely to be competent professionals at the job.

The tests were especially good for airline testing because past experience and flight time had little effect on the final *Stanine* grade.

United Air Lines has been using the *Stanine* tests since 1948. It is interesting to compare the results with the AAF study: (Figure 3)

In 1951-52 United Air Lines sent 271 pilot trainees into ground school, only 6% of those with high *Stanines* failed during training while 22% of those receiving average *Stanines* failed. (Figure 4)

C. M. Urbach, Superintendent of Placement for United Air Lines, says, "The AIR tests have been used by United Air Lines since 1948. We have been very pleased with the results of this testing program. The AAF research which enabled Dr. Flanagan to set up this testing program has greatly helped the air transportation industry."

In the same period, out of 96 pilot candidates who passed the AIR tests (5 or better) for American Airlines, only 4% have been released for unsatisfactory job performance, and *none* of these had high *Stanines* (7, 8, or 9).

The major airlines of the United States use the *Stanine* battery of tests because they are vitally concerned with safety. Even with skilled interviewers they have found that the *Stanine* method is a vital link in the chain of hiring. The results of the airline study are especially impressive in view of the fact that the applicants had been carefully screened before they took the *Stanine* tests! The number of men who had originally applied for employment as pilots were reduced substantially through a series of interviews and, in most cases, through the administration of standard tests and other personnel procedures. Only those candidates who appeared entirely satisfactory were sent to take the *Stanine* series. But it turned out that even this select group could be divided into relatively good and poor risks on the job.

Captain Sam Peters of Pan American's Pacific-Alaska Division has hired hundreds of pilots.

"I interview every man who applies for a pilot's job in our division," he said. "After I OK them, Personnel gives them a going over. From our point of view, every man who takes the *Stanine* tests is considered a prospective Clipper captain. Yet the *Stanine* results cut that number in half. The tests do more for us than simply 'select' good pilot material. We use the *Stanine* results in the progress study of each pilot-candidate while he is in training. For example, during our monthly Pilot Co-

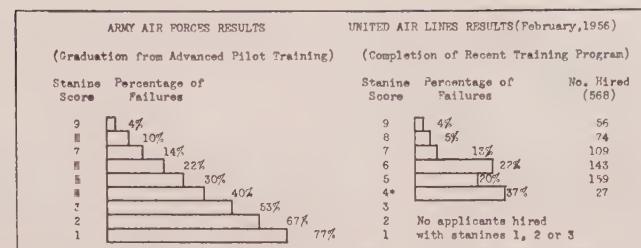


Fig. 3

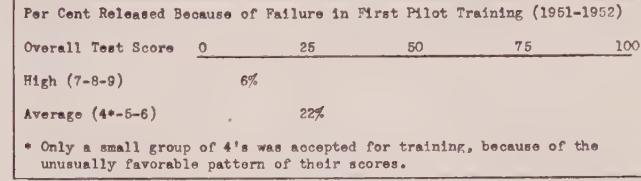


Fig. 4

ordinating Committee meeting the head of ground school indicated that one student was weak in mechanical relations but worked hard. We consulted his *Stanine* results and found that he was weak in mechanical relations but would make it up with an intense desire to learn and a lot of initiative. That case has been repeated many times."

Where is the well of pilots to come from if the executive flying industry is to expand as Bill Lear forecasts?

The airlines are growing at a fantastic rate, too. They have a constant need for new pilots. Will they attract the qualified men first?

There are many reasons why they might. The airlines hire in gross lots. This makes it worthwhile to advertise on a national scale. They can reach more pilots than can companies interested in one or two men. The airlines have a lot to offer—clear-cut working agreement, good retirement benefits, travel allowances, an ultimate jet captaincy, and a certain glamour of airline flying.

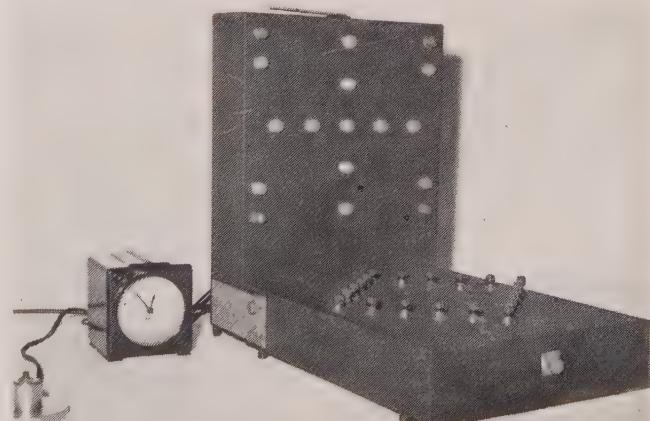
Out of the last 40 new-hires with Pan American's Pacific-Alaska Division, 33 were executive pilots. They complained that there aren't enough good executive jobs.

What happens to those men who take the airline's *Stanine* tests and get a 1, 2, or 3? The airlines will not hire them, yet they ostensibly have all of the qualifications? Will they then take their logbooks and personal records and best manner to the executive industry?

Or—if they go first to the executive flying industry to try and snare one of the lush jobs, will oral interviewing, personal history analysis, and flight time be enough?

Since an oral interview is usually subjective in nature and given by those unskilled in such techniques, many essential traits are glossed over. Although flight checks

(Continued on page 39)



SIGNAL REACTION TIME TEST apparatus has light patterns turned out by switches below. Tests applicant's response speed-accuracy.

The Gull is Royal

Italian Airframe Plus American Parts and Assembly Make Executive Amphibian

by Don Downie, *Executive Pilot, Hycon Mfg. Company*

There's only one amphibian in production today that is available to the general public. It's Italian-built, American-assembled and American-powered. It carries the first C.A.R. Part-3 certificate ever issued for an airplane built outside the United States to U. S. standards. That's the *Royal Gull*.

It's quite an airplane, too; big, roomy, relatively fast, rugged and comfortable. It handles like a small DC-3 and is as quiet as a DeHavilland *Dove*. All in all, it is quite an airplane and should find a spot in the American market for the corporation or exploration pilot who needs land and water fields and the added safety of good single-engined performance with a proven twin-engined aircraft.

The *Royal Gull* was originally designed and built by Piaggio & Co. of Genoa, Italy, for the Italian Air Force. Nearly 50 of these *Royal Gulls* have been in service with the Italian Air Force as patrol airplanes. In European operation, the *Gull* was equipped with Lycoming 240 engines, but the new model currently available in this country can be had with either 270 hp Lycoming GO-480 B1B, or the new supercharged model GSO-480-AIA 340 hp model for even better performance.

Piaggio & Co., designers and builders of the *Gull*, is a pioneer Italian airplane manufacturer with 38 years of experience. In addition to four-engined commercial transports, the company is Italy's largest builder of heavy and light transportation equipment for highways, railways and waterways. The 5,500 production workers and 800 technical and administrative employees produce streamlined railroad cars, coaches and freight cars, trolley buses, three-wheeled pickup trucks and the Vespa motor scooter.

American assembly of the *Royal Gull* is accomplished in Milwaukee, Wisconsin, by the Royal Aircraft Corp., a subsidiary of the Kearney & Tucker Corp., manufacturers of precision machine tools. West Coast distributors for the 11 western states,

Alaska, Mexico and the Hawaiian Islands, is the Aircraft Sales and Brokerage Co. of Long Beach, California, whose N221A was used on this SKYWAYS Pilot Report.

The bare Italian air frame is all that is shipped, by water, to Milwaukee, in a crate almost as big as a freight car. American engines, propellers, radios, instruments and accessories are installed. All structural fittings, with the exception of the main-wing and landing-gear bolts, are standard AN nuts and bolts. With this combination of American power plants and parts, no servicing difficulties are anticipated in this country. Cost estimates place the delivered price of the *Gull* at \$120,000, if built in this country, rather than the \$74,500 tab now on the amphibian, according to Mr. Leo Yoder, president of Aircraft Sales and Brokerage Co.

Power plant installation of the *Gull* is similar in many ways to the American Aero *Commander* which first came out with 240 hp Lycomings and then upped the power to 270. Here, too, the most recent models are utilizing

the supercharger which will up the 18,500-foot service ceiling substantially. The 5,000-foot single-engined ceiling for the 270 hp model will go up to above 10,000 with the latest power plants and produce a 190-mph airplane, according to Mr. Yoder. Bigger engines will increase the gross weight to 7,000 lbs. As this article is written, the new supercharged engines are being flown in Italy.

You don't actually realize how big the *Royal Gull* is until you first walk around it. Leo Yoder explained some of the finer points of the *Gull* before Bill Werstlein and I took the plane out on a cross-country trip to Las Vegas and the Salton Sea. You can walk under the wing of the *Gull* without ducking and it is necessary to chin yourself, or find a ladder, to inspect the inside of the engine nacelles. Mr. Yoder pointed out that standard operating procedure is to check the inside of the cowlings for loose filler caps, screw drivers or what have you. With its pusher propellers, any foreign matter vibrating out of the nacelles in flight goes directly into the



REAR VIEW SHOWS Royal *Gull*'s size. Note fuel-tank filler position, rear-baggage compartment location, extended-gear appearance, constant-speed propellers and nacelles.

propeller blades and then possibly into the side of the hull.

The two big 95-gallon fuel tanks are located in the hull at the center of gravity. This 190-gallon capacity gives the *Gull* a range of over 900 miles (5.5 hours) at 70% power and over 1,000 miles (6.5 hours) at 60% power. For long-range ferry flights, there is ample room immediately adjoining the present fuel system for additional tanks. An amphibian class record of 1,865 miles is held by the *Gull*, flown by a woman. This hop was made with a gross take-off weight of 7,716 lbs. with 240-hp engines instead of the regulation 270-hp powerplants.

To prepare the *Gull* for C.A.A. certification took six months' time and \$300,000 in expense. Changes requested by Royal included an enlarged fin and rudder area with 10 degrees more travel for improved single-engined characteristics, removal of the hydraulic system oil and air connections to the left wheel well for greater accessibility, and rerouting the exhaust stacks to the outboard side of the nacelles for noise reduction and to keep them from being sprayed with cold water.

There are many well-planned design features of the *Gull*. The engine cowlings, for instance, open up almost like an orange peel. The top cowl swings up with the removal of only six *Dzus* fasteners and the bottom section swings down with three more fasteners.

The big hull, which draws only 24 inches of depth in the water, is built up of seven watertight compartments. The tail wheel retracts with the main gear and a sea rudder and may be dropped for tricky taxiing jobs. Special brakes are completely sealed and

no water can reach them even if the wheels are lowered and used to taxi down ramps into the water. Right-seat brakes are standard equipment.

The Hartzell three-bladed, constant speed propellers are attached to a SAE #20 spline shaft and have the most desirable feature of automatic feathering if engine oil pressure fails for any reason. The props are mounted high and far back of the wheels to eliminate both blade damage from gravel on take-off or landing and water damage in rough seas. This propeller location materially assists in lowering the noise level.

The anchor is forward to take care of weight and balance problems. There are three baggage compartments forward immediately behind the rear seat and aft in the hull. The cabin baggage compartment is accessible in flight. The forward baggage door is 15"x30", the cabin door, 36"x40", and the aft baggage door, 20"x40", so that bulky articles can be carried with ease. Not counting the space aft of the rear seat which is normally used for hand luggage, there are 51 cubic feet of baggage space.

For additional sound-proofing in the cabin, Mr. Yoder has applied a layer of gummed acoustical aluminum foil over the back of the small baggage space aft of the rear seat. This application might well be unnecessary because of the low noise level of the *Gull*.

A 20,000 BTU Stewart Warner heater is located just inboard of the left engine. Cool air is piped through the heater and to four individually-controlled weather operation outlets in the cabin.

Two 12-v Wisco batteries, hooked in series, are mounted adjoining the

front baggage compartment and each engine is fitted with its own 50-amp Leece Neville generator. Each engine, in fact, has its own vacuum pump system and fuel boost pump. Two electric boost pumps have been added to the original engine-driven units. When a *Gull* recently lost a fuel pump, the company felt that the fuel pressure supplied through the cross-feed from the remaining pump was marginal. Therefore, the added electrical pumps should be used both for take-off and landing.

Gear, brakes and flaps operate from a hydraulic system with an electric Pesco pressure pump. The system has a novel standpipe system by which the last $\frac{1}{3}$ of the fluid remains in the system for lowering the landing gear, flaps and/or brakes with a hand pump in case of a hydraulic failure. During retraction, the main wheels retract into the hull and the tail wheel rotates 180°. In emergency use, the tail wheel does not come down but the aircraft lands on a reinforced bumper plate at the rear of the tail wheel housing.

This Las Vegas trip was to be my second hop in the *Gull*. A few days previously I had the opportunity to go once-around-the-field with a demonstration pilot, Eddie Mehl, at the Whiteman Air Park in San Fernando Valley. This hop, without the opportunity for a water landing, was just enough to whet a pilot's itchy throttle hand and our flight in Leo Yoder's demonstrator was just what the doctor ordered.

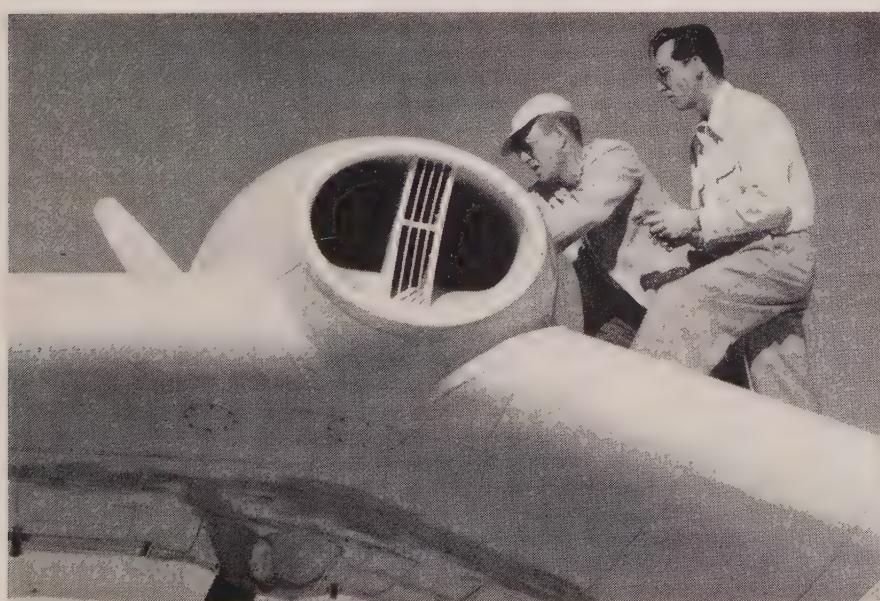
It was late on a Saturday afternoon when five of us, including my seven-year-old daughter, filed VFR from Long Beach to Las Vegas. Distance, 230 miles; flight time, 73 minutes, or an average of 173 mph aided by a slight quartering tail wind.

It's a long way up from the ground, even with the portable step, to the cockpit of the *Gull*. And, just like other airplanes where the cockpit is way out in front, there is nothing ahead of you but a small section of hull. It's only when you look back and up that you fully appreciate the size of the airplane.

The cabin interior and seating arrangement is more than consistent with the high quality of the aircraft. Door panels are leather and rugs are wall-to-wall. Front seats are adjustable to give leg room for even the tallest pilots, and my 6'2" folded into the plane without any difficulty.

The electrical panel is mounted on the ceiling and is a neatly arranged line of circuit breakers. Generator, ignition and starter switches are mounted in easy reach just forward of the circuit breaker panel, with

(Continued on page 43)



FRONT VIEW shows streamlined starboard engine nacelle with its vaned air intake and part of the gull-winged configuration. Pilot and author inspect engine, check oil.

Crash Rescue Protection



JUNE 1956

Park Lane Hotel
New York

Panel Finds Airport Crash Rescue Protection Picture Brightest Ever with Cooperative Approach. Panel Says:

- Design More Crash Survivorability into Planes
- Cooperative Fixed-Base-Airline Volunteers Needed
- Standards and Methods Should Be National
- Ask Local Volunteers to Base or Train on Field
- Seek Training Help from Services' Reserves
- Are Emergency-Exit Chop Marks Needed?
- Should Legislation Require Minimum Standards?
- New CAR on Minimum Crew Training Soon

Douglas C. Wolfe (*Broome County Airport*): "Today's discussion is on the need for practical methods for providing Airport crash fire protection. Provision of airport aircraft fire fighting equipment is based on the concept that aircraft accidents are more apt to occur during landings, take-offs and aircraft-servicing operations. Severity of the fire problem at the time of aircraft accidents has been established by experience. When it is realized that the movement area of an airport is relatively small, the high frequency of accidents on such areas indicates the need for airport-based rescue equipment.

"The National Fire Protectors Association has a suggested scale of aircraft rescue and fire fighting equipment which has generally been accepted internationally. Various surveys during recent years indicated that only 19 of 85 international airports meet the suggested standards. A domestic airport survey is underway. However, it is known that few of these airports meet the standards. The standards are based on aircraft gross weight to which life hazard potential and aircraft fuel capacity are directly related. The NFPA's extinguishing-equipment requirements



ATTENDING crash rescue protection discussion are (L to R, seated) Ed C. Hass, Hass Bros. Instrument Co.; Ed Lyons, Zahns Airport; Wilfred M. Post, Jr., mgr. A-B-E Airport, AAAE; Capt. C. B. Olsen, USCG; Douglas C. Wolfe, mgr. Broome County Arpt., N.Y.; C. G. Talbot, GE Co.; Hervey F. Law, PNYA; Joseph M.

Chase and Jerome Lederer, FSF; and (L to R, standing) B. A. Bradenbaugh, US Aviation Underwriters, Inc.; Alfred L. Wolf and Brian Ahere, AOPA; Clarence C. Pell, Jr., Marine Office of America; Frank J. Bowden, Jr., Del. Valley Council; John Groves, ATA; Oscar Bakke, CAB; and Vernon Brown, AA pilot, ALPA.

are based on the heaviest aircraft normally using the facility. While the number of daily recurring operations influences the assignment of personnel to man the equipment, the type of protection is constant.

"It has not appeared to be a major problem for airport authorities to finance equipment, but it seems to be a real problem for many airports to meet the recurrent annual expenditures for properly manning the vehicles. Equipment without trained man power is a ridiculous condition leading to a false sense of security and a serious life hazard to the airport user. Financing an airport fire department presents difficulties which must be faced. Surveys show 66 per cent of airports have protection by city departments, 41 per cent being city fire departments and 25 per cent under airport authority. Another group of U. S. airports are provided fire protection by the Federal Government, which allows its equipment to assist in all airport accidents, military or not.

"At the balance of airports, airport fire department administration is by county, Port Authority or commercial organizations. At these airports, the real financing problem exists, particularly the recurrent annual expense of providing trained man power. At some of these airports, the expense of providing trained personnel would exceed the entire operation's annual budget. Aircraft fire intensity and rescue problems associated with removing air-carrier occupants require effective and trained bodies of fire fighting and rescue personnel. Increased passenger loads and high-density seating, increase the need for trained crews to control fire and expedite rescue. Even with fully-paid fire departments staffed to handle the equipment available, there is need for trained auxiliaries to perform life-saving functions during control and extinguishment attempts. Small airports outside city fire protection districts may need to make up their complete fire and rescue groups with auxiliary personnel, whereas airports that have a fire-fighting nucleus may need only supplementary auxiliary forces.

"This auxiliary use is the key to an adequate airport rescue fire-fighting organization. It seems to point strongly to the need for all airport users to cooperate in providing the personnel. Airlines and all other airport users should actively encourage their employees to volunteer for this service and to effectively participate in the airport fire defense program. Cooperation of all the interested organizations promoting air travel and its safety is needed to solve this vexing problem before a tragedy necessitates Government intervention. That an answer to the problem is possible and feasible has been demonstrated. With this thought in mind, this Round Table discussion has been organized through the cooperation of the Flight Safety Foundation, the National Fire Protection Association and SKYWAYS.

"Mr. Lederer, you probably have worked on this problem. Would you give us your thoughts?"

Jerry Lederer (Flight Safety Foundation): "We are discussing only airports that cater to general aviation business, excluding larger airports like Idlewild, LaGuardia and Boston Municipal. We should put on record then that general aviation is a much bigger industry than the airline industry. At many airports, airlines are minor airport users. For example, in 1955 Allentown-Bethlehem-Easton Airport, Pa., had 9,996 scheduled airline operations and 26,224 non-scheduled airline operations, 52,500 scheduled passengers and 65,516 passengers that came from itinerant aircraft. I have a list of about 10 airports in the same general category. Their records show that the need is not only for airlines, but also to a greater extent at many airports, probably the majority, for protecting the non-airline occupants of crashed airplanes. In the past, emphasis has been on getting airline personnel to volunteer to be auxiliary firemen at the airports where they work.

ROUND TABLE PARTICIPANTS

DOUGLAS C. WOLFE, moderator, manager, Broome County Airport, Binghamton, N. Y.; is graduate Univ. of Tex. school of arpt management; was USAAF pilot, WW II; heads aviation-airport fire protection committee, AAAE.



JEROME LEDERER, "Mister Safety," has worked tirelessly for aviation safety for years; managing director of Flight Safety Foundation; was formerly chief engineer for Aero Insurance.

WILFRED M. POST, JR., manager Allentown-Bethlehem-Easton Airport since 1937, pilot since 1933; is former chairman AAAE liaison committee with NFPA on airport fire protection; treasurer AAAE.

HERVEY F. LAW, general manager airport operations division PNYA; soloed glider 1914, plane 1917; taught flying Signal Corps 1917-18; airport engineer Bureau of Air Commerce 1934; CAA regional supervisor of airports Region 1, 1939; present post 1947.

JOHN GROVES, manager ATA eastern regional office; 29 years in civil aviation; 17 years with CAA in various capacities; with the ATA 13 years; pilot; 1st manager Washington National Arprt.

ALFRED L. WOLF, attorney; a founder, director and presently secretary and general counsel AOPA; AF Reserve colonel; chairman joint airport zoning board, Philadelphia International Airport; pilot and owner since 1929.

CLARENCE C. PELL, JR., aviation adviser Marine Office of America; BS Harvard Univ 1933; soloed 1934; has airline transport rating; was plane commander Air Transport Command during WW II; in aviation insurance business since war; member IAS.

OSCAR BAKKE, deputy director CAB Bureau of Safety Regulation; with CAB 1946-56; AF pilot 1941-46; AF reservist with MATS; has wide CAB experience in safety, accident investigation, standards and radio navigation.

CAPT. C. B. OLSEN, US Coast Guard, eastern area air and operations officer since 1954; chief aviation division 1950-54; USCG Academy 1928; USCG aviator 1932; post graduate aeronautical engineering master's degree, Calif. Inst. of Tech. 1942.

JOE CHASE, manager maintenance and equipment division, FSF; has been active in aviation since 1929; he spent 12 years with UAL, was with CAA, and before joining FSF, was manager, aviation department, Kemper Insurance Co.

VERNON H. BROWN, flight captain, American Airlines, 15 years service; in aviation 20 years; formerly fixed-base operator, Springfield, Mo.; served as ALPA representative to NFPA, and worked on NFPA technical committee; flies regular New York-Tulsa run in DC-6's and -7's.

CURTIS G. TALBOT, manager General Electric Co.'s flight test center, Schenectady, N. Y., with 20 years company service; electrical engineering graduate Univ. of Ill. 1936; member NBAA board; associate fellow IAS, SAE.

ED LYONS, manager and co-owner Zahns Airport, Inc., and Amityville Flying Service, Inc., Amityville, L. I., N. Y.; ATR rating and CAA flight examiner; flying since 1928; was senior flight training supervisor for CAA-WTS during WW II.

BRIAN AHERNE, motion picture actor; private pilot since 1935; first plane was WACO F-3 which he flew across the continent eight times; last plane a Bonanza; has AOPA membership number 9; attended in interest of AOPA and as friend of Alfred L. Wolf.

"In view of this information and these figures, the shoe fits on the other foot. The airline people should participate, but apparently at many airports airline people are in the minority. The fixed-base operator and the other airport people will have to supply most of the personnel for the auxiliary fire department. The problem would be minimized if engineers designing airplanes could provide more passenger crash survivability. A lot of work is being done in this field by Cornell, NACA and Col. Stapp, toward crash survivability so a passenger can escape unaided when an airplane cracks up. If that were done, the problem would be minimized, but we would have the problem of what to do with 60,000 currently-operating airplanes that are not so designed. Future airplanes will probably be designed to provide survivability. Chances of keeping crash fire away from the cabin will be better. The best example of that today is the *Convair* where the fuel wing tanks are out-board of the engines and fuel is kept away from the fuselage in a crash. Bag-type tank use and many other things can reduce the problem. Meanwhile, we must do what we can with the airframes we have. Airplanes could be marked so that people know *where* to operate escape hatches, *how* to operate doors, and *where* to break in and cut in the fuselages. NACA has been testing this on fighter airplanes, and they have reduced rescue-operation time by 60 per cent by using markers that point to the right button to press after an airplane cracks up.

"Getting back to this Round Table discussion, the problem has at least three facets. One is economic. How can you afford to pay for this crash-fire protection? Volunteer crews provide a large measure of solutions to this problem. Two, workmen's compensation comes in, as do the liability of the airport to provide this protection, and the liability the airport incurs if these people damage aircraft during the rescue operation. Then there is the moral question. Do the operators feel that they should provide this, and what are the consequences if they don't provide it and an airplane cracks up at the airport?

"I will complete my introduction by reading three citations where auxiliary fire departments have proved valuable. One was at the airport operated by our moderator, Mr. Wolfe.

"On May 28, 1954, a lightplane went out of control in a steep climb following a landing attempt at Broome County Airport. The airplane struck the ground beyond the landing area and dropped down a steep embankment, critically injuring the occupants. Within seven minutes from sounding the alarm by the control tower, the volun-

teer emergency crew reached the scene, removed the occupants from the wreckage, administered first aid, carried them to the top of the embankment and placed them in an ambulance. Their fast action and expert performance is credited with saving the pilot's life.

"Another case, Burbank Airport, which is a bit larger than we contemplate here but shows the value of the volunteer crew. For outstanding performance in the face of known danger which averted a major disaster on September 8, 1955. The passengers of an aircraft which crashed on that date owe their lives to the quick, efficient, heroic action of these men. Upon impact, the spilled gasoline which gathered under the wreckage had burned. Immediately, some of the men attacked the flames with portable equipment, while the others started the evacuation of the passengers. Within 92 seconds two fires which were burning at a fuel source of several hundred gallons were brought under control and injured passengers and crew members were being removed. The incident is a significant example of where fire consciousness gained through regular safety training together with exceptional bravery saved human lives."

"In our bulletin, that came out yesterday, we have the third case. A corporation airplane made an emergency landing at Toledo Express Airport. This is the letter from the corporation's chief pilot to Thomas Metcalf, manager of Toledo Express Airport. 'I would like to congratulate you on your well organized emergency crew and the method in which the emergency landing was handled yesterday at 9:25 when our DC-3 ruptured a hydraulic line forcing us to make a no-flap, no-brake landing. I would like to say that it is certainly comforting to see all the necessary crash equipment standing by when it is anyone's guess what an airplane will do under the above conditions. Also, please convey my thanks to the tower operators for the wonderful cooperation.'

"Finally, I emphasize the legal and economic aspects of this problem, which can be covered by others here."

Douglas C. Wolfe: "Thank you Jerry Wiley, as manager of a small airport will you give us your thoughts?"

Wilfred M. Post, Jr. (Allentown-Bethlehem-Easton Airport): "Some five years ago, I became involved in this matter when I was handed a hot potato by the American Association of Airport Executives. I was asked to head up a liaison committee from that organization with the NFPA Committee on aviation and airport fire protection. The first standards were being considered by NFPA. In fact, the draft had already been written, which created much

(Continued on page 32)



"I AGREE THAT TRAINING is the most important thing; without trained men, equipment quality doesn't matter," says Hervey F. Law, general manager of the airport operations division of PNYA.



"WHAT TO DO and how to pay for it are problems of mechanics relatively easy to solve now that we are agreed to face the facts," says Joseph Chase, mgr., maintenance & equipment div., FSF.

Jean H. DuBuque

Executive Director, NBAA

Business Aircraft Pay

Profitable Dividends

If one were to select a single development that has most significantly contributed to world progress, the airplane might well be that choice. The airplane, particularly the vast fleet of business aircraft now flying the nation's skyways day and night, is highly symbolic of the tempo of modern commerce and its influence on the lives of American businessmen.

Each year finds that a greater number of private companies and corporations—large and small—have turned to the airplane for more expansive business markets and increased productivity of their executives and staff personnel. Such a company is the fast-growing E. T. Barwick Mills, Inc., of Chamblee, Ga.

Given the right man in the right place at the right time and the American story is enacted over and over again. The man in our story is Mr. E. T. Barwick, dynamic president of a tufting company bearing his name. Back in 1949 was the time when "Gene" Barwick, 35-year-old resident of Atlanta, Ga., served as merchandising manager of the floor-covering department of Sears Roebuck in the Southeast.

In March of that same year, Barwick decided to go into business in Dalton, Ga., and to produce tufted cotton rugs. In October 1952, with an ever-increasing demand for his products, Barwick purchased a second plant, an unused hosiery mill in LaFayette, for the manufacture of cotton carpets. In only six years, Barwick's original investment of \$4,500 has pyramided into well over a \$30-million-a-year business. Today, his tufting companies rank as the largest producers of cotton carpeting in the world, having both national and export distribution.

Super-merchandiser Gene Barwick leaves nothing to chance. He flies a constant stream of wholesalers' executives to the LaFayette plant in his DC-3, "The Remnant 11." There customers see the carpets in production and are home again the same day or the next.

These visitors are brought in, in spite of an almost constant expansion of the plant facilities with new con-

struction underway and new equipment filling odd corners. The plant literally grows before your eyes. A new 20,000-square-foot fabrication room now houses the last word in yardage machines. The entire area is air conditioned to protect yarns, steel machinery, and to keep workers comfortable.

This plant expansion seems to add a third element of motion as the needles of the tufting machines hum and the carpets revolve in the dye becks. Working six days a week around-the-clock, the mill produces many thousands of square yards of carpeting.

The manufacturer of tufted carpet has long challenged the ingenuity of the industry. Barwick was one of the first to apply the tufting method to rugs; made them on 8-needle and 16-needle machines in the beginning. The company then developed a 4-foot yardage machine, and later made models which handle widths up to 12 feet. New models are now installed that tuft even wider carpets.

Barwick Mills has other firsts, in addition to initially using the tufting method on rugs. It was the first to employ an all-jute backing for tufted rugs and one of the first to coat the

rug back with latex. The jute backing is imported in great rolls, woven in India because of a law which forbids exportation of raw materials in this category.

President Barwick, in analyzing some of the factors that have contributed to the phenomenal growth and success of his company, offered this wise counsel. "In doing the big job ahead, we try through use of the most progressive devices available to executives, to broaden the horizons of both control and supervision with an eye always to its help and encouragement to our young executives on the way up. This sort of supervision has meant that two or three of us must constantly be on the move. I travel about four times around the earth every 12 months, helping solve problems in the plants, calling on our customers, our distributors and our sales organizations, attending markets, meeting with the trade and general press, visiting with foreign potential distributors, or generally just scouting the markets. To meet this sort of schedule, we maintain our own 14-passenger DC-3 and one four-passenger Beechcraft, constantly in use

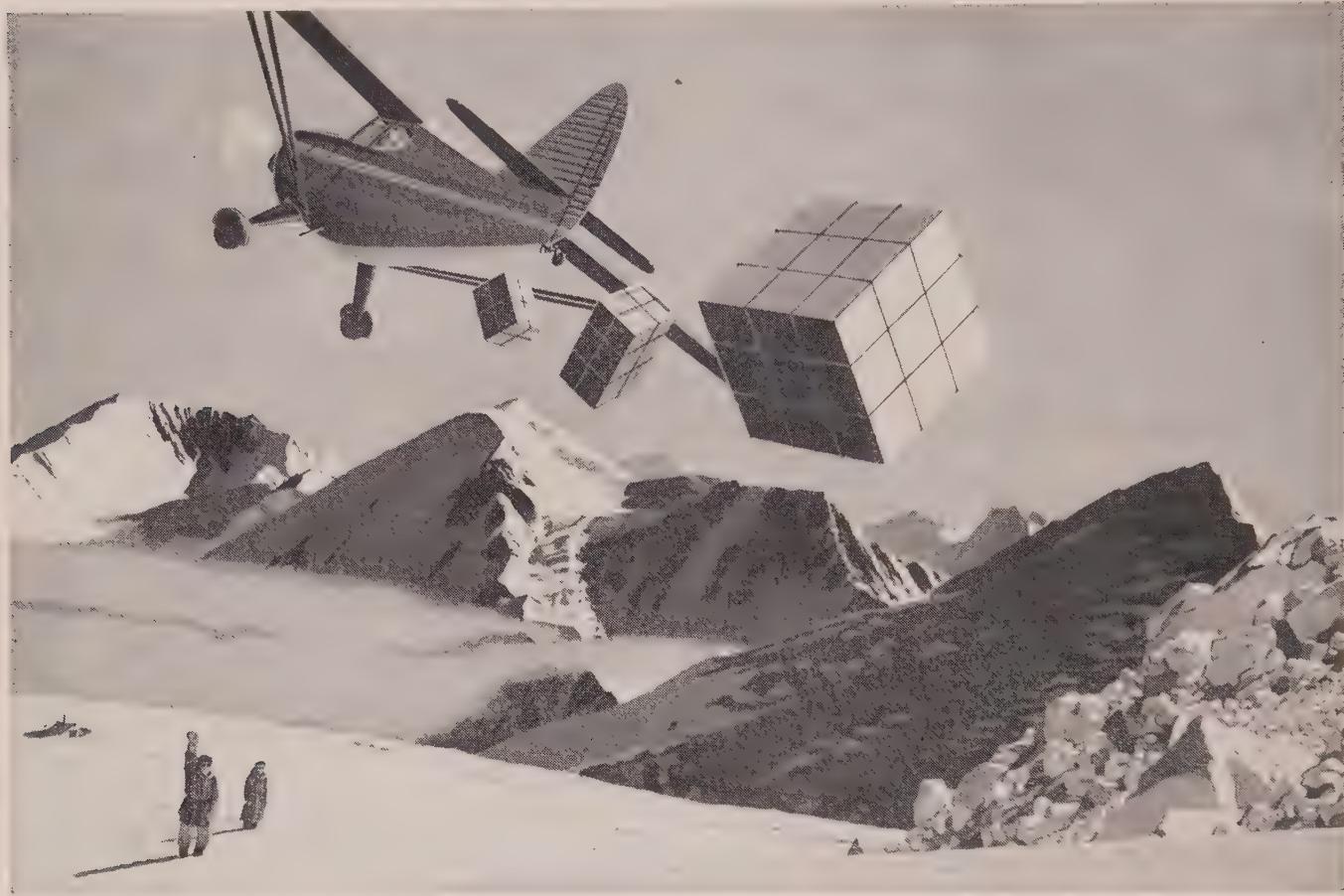
(Continued on page 51)



GROUP OF PURSE & CO. salesmen and dealers arrive in Barwick's DC-3 "Remnant II" to visit the Barwick mills to get first-hand information on the cotton carpeting business.

PLANE FAX

by STANDARD OIL COMPANY OF CALIFORNIA



Delivering groceries to the Sierra crest

Snowbound in June! Every year from November to the first days of summer, a snow-survey engineer and his wife are isolated in their home high in the mountains south of Lake Tahoe. And each month Max Jones, a grocer of Gardnerville, Nevada, flies over the Sierra Nevada's crest to drop fresh vegetables, meat and mail into the soft snowdrifts piled near their door.

"Much of the trip is low-level flying," says Mr. Jones. "In spite of going over the top at 10,000 feet I don't have much room to spare. But even in a downdraft I get all the power

I need with Chevron Aviation Gasoline 80/87 in our Stinson's Lycoming. Chevron 80/87 gives me performance to spare when I'm climbing, yet I can lean down for real economy in level flight. Burns clean, too; never fouls plugs. Flying over this kind of rugged wilderness calls for a really dependable engine. Ours has 500 hours on it now, and RPM Aviation Oils have kept it good as new. Compression is still up to factory standards. It's never missed a beat, always runs smooth as a watch. All the years I've flown, I've never had engine trouble using 'RPM'."



TIP OF THE MONTH

Downdrafts are often violent near the top of a mountain range. Mr. Jones advises flying on the windward side of any ridge or pinnacle; then you can turn upwind if you hit a pocket.



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SKYWAYS FOR BUSINESS

News Notes for Pilots, Plane Owners Operating Aircraft in the Interest of Business

Detroit Executive Commutes In Own Helicopter

Detroit, Mich. Frederick C. Matthaei, chairman of the board of American Metal Products Co., is believed to be the first business executive to rise above rush-hour traffic in commuting to and from his office by personal helicopter.

The 63-year-old businessman estimates that his three-place Bell Model 47H will save him at least 200 hours a year just in travelling between his home, Radrick Farm, near Ann Arbor, and his office, Linsdale and Epworth Sts. in Detroit.

Matthaei covers the 35-mile trip in 20 minutes, about one-third of the time required by any other type transportation. Although currently employing a pilot to fly him, Matthaei plans to learn to fly the helicopter and in time to act as his own chauffeur.

Ohio Highway Patrol Gets Own Cessna 180

Dayton, O. Ohio's highway patrol department recently took delivery of a new Cessna 180 from Richland Aviation, Inc., Mansfield, O.

The new plane, equipped with a McCauley Met-L-Matic constant-speed propeller, will be used for air searches, mercy missions, manhunts, disasters, traffic control, flood relief, highway-patrol-officer transportation, and other similar needs.

COPA Action Gets Ontario Highway Gas Tax Revoked

Ottawa, Ont. Action by the Canadian Owners and Pilots Association (COPA), Canadian counterpart of AOPA, has resulted in revocation of the 11¢-per-gallon Highway Gasoline Tax in the province of Ontario.

Previously, all aviation gasoline users had to pay the tax at time of purchase and then claim for a refund. Standard forms needed for the claim were not always available at point of purchase and claims had to be mailed within six months after purchase date. Further, absolutely accurate signed receipts had to accompany claims or they were returned with resultant delays.

The cumbersome procedure was revoked by a recent Act of the Provincial Government and was expected to be in operation by now.

All other provinces except Quebec have removed the Highway Gas Tax, or never applied it to aviation.

Mining Operation Gets Boost From Helicopter

Hidden Splendor, U. When the Atlas Corp. decided to test drill for uranium near here, they met the problem of putting an air



CLAY ORUM, chief pilot, Humphreys Gold Corp., Denver, in cockpit of company's new On Mark Executive A-26. On Mark Engineering Co., Glendale, Calif., built custom model.

compressor on top of a 1,500-foot canyon wall at the 7,000-foot level by flying it piece by piece by helicopter.

The event was reported by LeRoi division of Westinghouse Air Brake Co., makers of the air compressor used on the job.

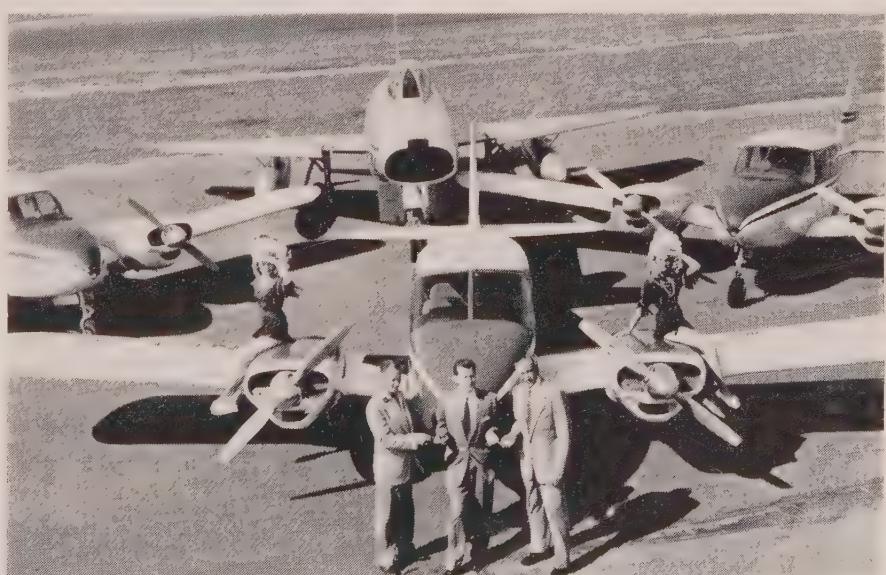
Air Materiel Command Offers Surplus Planes

Wright Patterson AFB, O. The Air Force's Air Materiel Command here has announced the surplus sale of 220 cargo and trainer

airplanes to be accomplished within the next several months.

Invitation to bid No. 290-56, issued for the first sale involving 25 C-45's, 25 T-11's, and 5 T-7's, opened May 14. Dates of the other three sales offering 55 more aircraft each will be announced later.

All of the planes were purchased between 1941 and 1944 and have been declared surplus. All sales will be held at Hill Air Force Base, Ogden, U., and the first group can be inspected there Mon-Fri between 9 a.m. and 3 p.m. More information available from Property Disposal Officer, Hill AFB.



THREE PIPER APACHES join North American Aviation, Inc.'s transport flight section to serve company executives. Super Sabre F-100 (background) seems awed by the light twins.

Pilot Life Insurance

Rules Easing, Survey Shows

New York, N.Y. During 1955, rules for issuance of life insurance policies to persons who operate planes for their own pleasure and personal business, were widely liberalized.

The most recent survey shows that 87% of a group of representative companies questioned will accept at standard rates owner-operators of planes who meet certain qualifications as to age, flying experience, and expected flying time.

When the last survey was made in 1948, no companies were known to be issuing standard-rate policies to such applicants.

Of the 87 companies, about three fifths have a limit on the annual expected flight hours, most frequently 110 hours. The remaining two-fifths of these companies limit the expected flying hours and also the amount of insurance issued, usually \$50,000.

The Institute of Life Insurance which just completed the survey said, "The liberalization in the underwriting of persons engaged in private flying is a reflection of the improved mortality among owner-operators of planes."

Business-Flying Newcomer Has Passenger Booklet

Alpena, Mich. The Besser Co., which only recently joined the growing army of manufacturing concerns which provide air transportation for their customers and executives, has published a 12-page booklet for orienting their passengers.

The booklet, called "Bes-Air," introduces the airplane—a Beech Super 18—the pilot, and related flight matters like safety, take off, landing, cruise, weather, maintenance, and items for passenger convenience.

Each passenger gets a book when he enters the plane. By take off time he's had enough time to be well prepared for his experience.

New Helio Courier 10 MPH Faster, Has Greater Range

Norwood, Mass. The 1956 model of the Helio Courier is reported to have an increased range of 745 mi and 167-mpg cruise at 70% power at 8,500 ft—an increase of 10 mph over earlier models.

The new model is reportedly much quieter, has more luxuriously appointed cabin, the same 260-hp geared Lycoming engine, and a redesigned windshield and other aerodynamic improvements that make the increased speed and range possible.

Helio Aircraft Corp. reports that it has delivered 28 of its four-place executive-utility planes since setting up assembly-line production last August.

Auto Dealers Say Plane Cuts Car-Shipment Cost

Poughkeepsie, N.Y. Two upstate New York automobile dealers, Chandler Pease, Chatham, and Wesley Van Benschoten, Poughkeepsie, say that using their airplanes

.... in the business hangar

• Pilots Jack Mitchell and Jake Roemis recently brought the Gulf Research & Development Co.'s "Flying Magnetometer" to Executive Aircraft Service, Inc., Dallas, Tex., from Venezuela for double-engine change, inspection and repairs.

• AiResearch Aviation Service Co. of the Garrett Corporation, Los Angeles, Calif., pioneers in private-business aircraft weather-radar installations, have just installed the first Collins WP101 C-Band system for a Convair 340 in the 340 of the Continental Oil Co., Houston, Tex. AiResearch has produced nose modifications for weather radar systems for DC-3's, Lodestars or Convairs without lowering top airspeed limitations of the planes. They install Collins, RCA and Bendix systems.

• Some recent Narco DME installations: DC-3 of Union Chemical and Materials Corp., Dallas, Tex., Charles W. Bolton, pilot; sold and installed by Associated Radio, Dallas; C-47, United Aircraft Corp., Hartford, Conn., Ralph Borden, pilot; sold by Van Dusen Aircraft Supplies, installed by Atlantic Aviation, Teterboro Airport, N.J.; Beech D-18, Wayne Knitting Mills, Fort Wayne, Ind., Sid Stone, pilot; sold by General Aviation Corp., Detroit, installed by Airborne Communications, Cincinnati. Two DC-3's, Chrysler Corp. Wm. Hinton, director of flight operations; mechanical installation certified by Anderson Aircraft Radio, Detroit, Narco installation center. Entire fleet of Sinclair Oil's multi-engined planes now equipped with DME.

• Benton & Bowles advertising agency took their D-18S to Atlantic Aviation, Teterboro, for installation of Bill Conrad's Safety Performance Kit. The speed conversion, designed by Gordon Israel was installed during the 1,000-hour inspection. Chief pilot is Jesse Frack. Another Bill Conrad Speed Conversion was installed in the D-18S of Lehigh Valley Air Service, flown in by Chuck Dwight for a 100-hour inspection and dual-engine change.

• Paul Duncan, pilot for Green Construction Co., Oaktown, Ind., recently had his Twin Bonanza at the Roscoe Turner Aeronautical Corp. hangar, Indianapolis for a 100-hour inspection.

• Leon Boyd, chief pilot, and Ralph J. Bailey, pilot, for Ryder Systems, Inc.'s Jacksonville, Fla.-based Lodestar flew the plane into Aero Corp., Atlanta, Ga., recently for extensive modifications and repairs, including: Speed Kit installation, flush antennas, removed "bat" wings, additional radio equipment, picture windows, reworked interior, repainting, and relicensing.

• Dow Chemical's DC-3, now at Reading Aviation Service, Inc., is undergoing 10 days' modification for Bendix X-Band Radar and fitting with Eclipse-Pioneer 200-amp generators. Russell Purchase captains the Midland, Mich.-based plane.

• O. L. Adams, formerly with Marine Exploration and now with Gulf Refining, stopped at Southwest Airmotive last month with Gulf's chief pilot, Burrow Minard, in the company's Cessna 180.

• Horton and Horton have completed the design and fabrication of a special interior in a Lockheed 12 purchased and modified for Pure Oil's Southwestern Production division. Pilot Bruce Crockett and co-pilot Gerald McLennan, both of Ft. Worth, will fly the plane from Tulsa. A. E. Harnsberger is Pure's NBAA rep.

• National Distillers has specified complete Bendix communication and navigation equipment for the Super Ventura it has ordered from Howard Aero. It will have Bendix RDR-1 airborne weather radar (X-Band) and the new DFA-70 DF system.

• A Safe Flight Instrument Corp. SC-24 speed control system was recently installed in Michigan Tool Co.'s Lodestar, and chief pilot, Paul C. Holst, is planning a similar installation in their D-18 Beechcraft. An International Harvester DC-3 with the SC-24 was recently calibrated by Safe Flight personnel at Bridgeport, Conn. Raul Castro was the pilot in charge.

• Rockwell Spring and Axel Co.'s DC-3 has just had a new Bendix RDR X-Band radar installed at Remmert-Werner, Toledo. Installation includes terrain mapping and Racon beacon, and one-piece, laminated, hinged radome. Harry Dawson is the pilot.

• Henry Boggess, aviation director Sinclair Refining Co., Tulsa, and NBAA president, recently equipped his company's C-47 with a Collins 18S-4A medium-frequency telephone set, installed by Aerotron Radio Co., Tulsa, Okla.

• Lane Hartwell, chief pilot for Essex Wire Corp., announces that his company will very soon move their executive-plane operations from Detroit to one of the Leeward Aeronautical Service hangars, Baer Field, Fort Wayne, Ind.

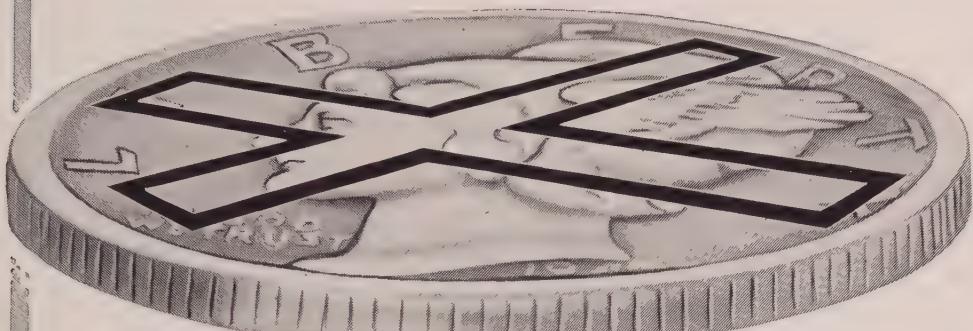
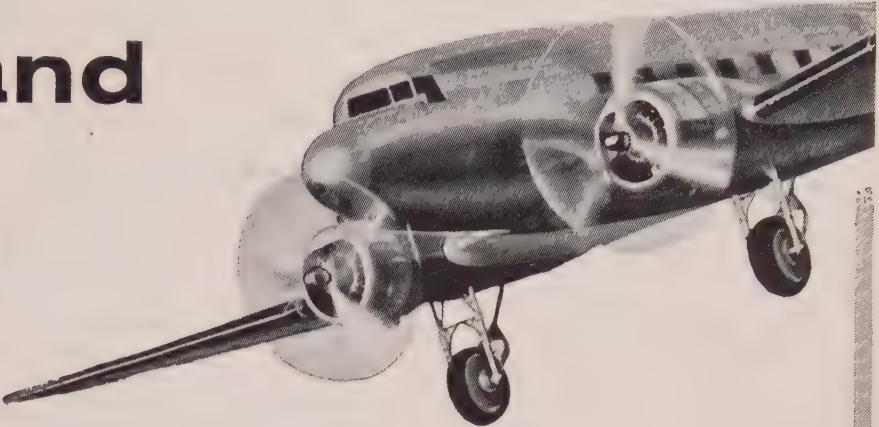
• An auto pilot, weather radar and JATO were installed in the DC-3 of the Esso Shipping Co., NYC, at Executive Aircraft Service, Dallas, Tex.

• Fish Engineering Co., Houston, has equipped its Beech D-50 with a Flite-Tronics CA-1 audio amplifier and an MB-3 marker beacon receiver. Installation was made by J. D. Reed Co., Inc.

• G. T. Culpepper and Marion P. Dow, pilots of Texas-Illinois Natural Gas Pipeline Co., recently visited Dallas Airmotive, Inc., to have all their Pratt & Whitney R-2000 engines for their DC-3's overhauled.

(Continued on page 47)

ever land on a dime?



SC-24 for
multi-engine airplanes

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Corporate pilot, sportsman, or business executive—you have had the experience of landing on a short strip, and the same uncertainty in a take-off from a short runway . . . and there are *many* of them throughout the country!

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Canada Installing Coast To Coast Radar Airway

A radar network will be a major factor in the Canadian Department of Transport's comprehensive program of transcontinental airport development and air traffic control, specifically aimed at equipping Canada's airways for the jet age. A major portion of the development and production of the radar installations will be carried out in Canada under a subcontract to Raytheon Canada Ltd., Kitchener, Ontario, a firm jointly owned by Dominion Electrohome Industries, Ltd., and Raytheon Manufacturing Company, Waltham, Mass.

The radar installations will be made at airports in the following locations: Moncton, Seven Islands, Quebec, Montreal, Ottawa, Toronto, London, North Bay, Fort William, Winnipeg, Regina, Saskatoon, Edmonton, Calgary and Vancouver. Raytheon will start delivery of the units early in 1958.

The equipment, designated Airport and Airways Surveillance Radar (AA SR), will make it possible to keep aircraft flying between any of Canada's 15 major airports under close observation, even in stormy weather. Raytheon engineers are confident that their equipment will permit each airport to track large commercial airliners within a radius of up to 200 miles. Since Canada's principal airports, with but one exception, are no more than 400 miles apart, the overlapping patterns of radar surveillance will provide almost continuous coast-to-coast coverage.

The ability of the AASR system to detect and track aircraft in rain and other bad weather—which frequently causes excessive “clutter,” or visual interference, on the radar viewing scope—is obtained through the flexibility of the system which permits the operator

to select either linear or circular polarization of the radar signal, depending upon weather conditions.

In explanation, linearly-polarized radar is often unable to “see” targets in storm-clouds, since target and clouds both reflect the radar beam. To eliminate this handicap, the radar operator can elect to apply circular polarization to the outgoing beam, which is roughly like putting “English” on a billiard ball.

When these “twisting” microwaves strike the storm-cloud, millions of spherical raindrops bounce them back to the antenna *with a reverse twist*. Their path to the receiver is blocked by an electronic filter so that *they cannot register on the radar scope*. When the microwaves strike the irregular surfaces of a solid object such as an airplane, however, many of them return to the antenna retaining their original twist. Thus *they pass unhindered* through the electronic filter to

the receiver and *register as targets on the radar scope*.

Also contributing to scope-presentation clarity is MTI or “Moving Target Indication,” a built-in ability to select *only moving objects*, by filtering out reflections from fixed objects, such as buildings, mountains and other undesirable reflections, from the radar viewing screen.

It is necessary, however, for the operator to pinpoint the exact geographical location of the plane at all times. In the AASR this is accomplished by “video-mapping” which makes it possible for the operator to flip a switch to superimpose onto the face of the radar scope an electronically-generated map of the territory over which the plane is flying at the time of the observation.

The giant, 40-foot antenna used with this equipment was especially designed not only to provide a 200-mile scanning range but also to permit the tracking of planes flying as high as 70,000 feet. The favorable altitudes for efficient jet operation are at 35,000 feet or more and it is at these heights at which air traffic will become congested. The antenna is also equally effective for low-altitude coverage, where the slower aircraft will continue to fly in ever-increasing number.

Chances of a breakdown of the radar coverage are reduced because the equipment has been constructed, in effect, as two systems in one, with



dual controls and functioning parts permitting uninterrupted operations through either system.

A statement issued by George C. Marler, Canadian Minister of Transport, described the long-range program of airport development and air traffic control being carried out by his department, including the construction of lengthened runways, improved terminal buildings and other public facilities, the installation of high-intensity lighting systems to facilitate landings in inclement weather, and a wide range of electronic-navigational and traffic-control devices, in which Raytheon's AASR system will play a major part.

Runway Visual Range, New Approach Minimums

Although the use of the Runway Visual Range (RVR) measurement, *by itself alone*, as a minimum for straight-in landing on runway 4 at EWR (Newark) was authorized last winter, there still seems to be some confusion as to its application. RVR is the distance a pilot about to touch down can expect to see the high intensity runway lights.

At EWR, RVR will be reported when the values fall between 2,000 and 6,000 feet, and will appear in the remarks section of the weather sequence report. When measurements of Runway Visual Range are being taken, the tower will provide pilots commencing an approach with the reported meteorological ceiling and visibility, *and in addition*, will give the current RVR report.

Runway Visual Range is measured by a transmissometer at the approach end of the runway. It differs from "end of the runway weather reporting" in that RVR measures existing visibility down the runway: whereas, "End of the Runway" reporting measures the meteorological condition in the approach and landing area.

Runway Visual Range has been successfully used in Europe for some time. The RVR procedure at EWR is a service test for the U.S. Runway 4 at EWR was selected because it was the best equipped ILS runway in the U.S. If this operation demonstrates that the Pilot actually is given more accurate information as to what to expect when he breaks out underneath and that, as a result, safety is increased and operation made more dependable, RVR will probably be extended to other airports that have suitable lighting and other instrument approach aids.

When the weather reports for EWR are below ILS minimums (200 and $\frac{1}{2}$), an ILS or PAR approach may be conducted to runway 4 provided RVR is

Air-Aids Spotlight

AKRON, Colo.—*LFR* being decommissioned and approach cancelled.

ALEXANDRIA, La.—VOR shut-down until about 2nd week of July.

AMARILLO, Tex.—*ILS Outer Compass Locator converted to radio beacon called TRADE-WIND, "TDW" on 338 kc. ST. FRANCIS radio beacon decommissioned.*

BOWLING GREEN, Ky.—VOR/DME due to resume operation on 116.2 mc.

CHARLESTON, W. Va.—VOR due shut-down until end of August.

CASPER, Wyo.—VOR frequency changed to 116.2 mc.

CHICAGO, Ill.—Experimental hi-intensity flashers installed at threshold of Runway 31—Left for ILS Back Course approaches.

CINCINNATI, O.—VOR/DME due for shut-down and change of frequency to 115.4 mc.

COLUMBUS, O.—*LFR* operating as ADF beacon only 1st week June.

DETROIT, Mich.—WILLOW RUN TOWER requesting all inbound aircraft make 1st contact with APPROACH CONTROL 124.9 mc from EAST, 121.3 mc from WEST if possible.

GAINESVILLE, Fla.—Airline installing VOR facility. Weather, communications and approach may not be available to general public.

GREENSBORO, N. C.—*LFR range approach night-visibility minima now 1 mile.*

HOBBS, N. Mex.—VOR frequency now 116.6 mc.

HOUSTON, Tex.—Procedure turn altitudes raised, also ILS back course pullout.

JACKSONVILLE, Fla.—ILS procedure turn altitude raised to 1,600', missed approach lowered to 1,200'.

KEENE, N.H.—MISSSED APPROACH HOLDING PATTERN revised. Now NORTH of facility.

KNOXVILLE, Tenn.—Omni approach procedure-turn altitude lowered to 2,500', final approach courses now 069° and 249°.

LAFAYETTE, Ind.—BVOR relocated 7 mi. NW of PURDUE Field, frequency 112.0 mc.

LANCASTER, Pa.—TVOR commissioned on field, 111.8 mc—identifies "This is LANCASTER—Garden Spot of America!"

LAS VEGAS, Nev.—CRYSTAL FM out until middle July. Enroute minimum altitude NE of LAS VEGAS 8,000' Victor, 10,000' LF Airway.

LAWRENCEVILLE, Va.—VOR due shut-down until August.

MCALISTER, Okla.—VOR due shut-down until mid-August.

MEMPHIS, Tenn.—*ILS Outer Locator changed to MHW beacon, identifies "BXS," (for BROOKS) on same frequency.*

PITTSBURGH, Pa.—Lead-in light system serving Runway 27 at ALLEGHENY. Variable intensity red bar lights from 1,500' out with green bar lights across runway threshold. BVOR scheduled for ELLWOOD CITY approximately at TURNPIKE Intersection on Victor 37 north of PITTSBURGH, ident. "EWC," frequency 114.2 mc.

PLATTSBURG, N. Y.—VOR/DME to resume operation on 116.7 mc.

RED BLUFF, Cal.—VOR resumed operation on 115.7 mc.

ROYSTON, Ga.—VOR (ATL-SPA) due shut-down until mid-August.

ST. AUGUSTINE, Fla.—New tower at FAIRCHILD Field. Guards 122.5 mc, 3023.5 kc. Transmits 272 kc. Operates 0830-1700 EST, Mon.-Fri.

SALT LAKE CITY, U.—Victor Airway 32 BONNEVILLE to FORT BRIDGER and V-21 OGDEN TO UTAH LAKE NOT USABLE UNTIL SLC VOR resumes operation, late June.

SIOUX FALLS, S.D.—*LFR* and VOR identifications changed to "FSD."

UTICA, N. Y.—*ILS Localizer and Glide Path commissioned serving Runway 33, identifying "UCA" on 109.3 mc with voice. Middle Marker Locator "CA" on 254 kc located 0.7 mi from end of runway. MHW beacon on 275 kc "UTI," 4.4 mi out.*

WASHINGTON Area—CAA playing Musical Chairs with ADF beacons in area! CHARLOTTE HALL frequency changed from 317 to 266 kc, HUNTINGTOWN changed from 266 to 391 kc, SHADY-SIDE from 391 to 317 kc.

WEST PALM BEACH, Fla.—VOR shut-down to mid-August.

WILKES-BARRE, Pa.—*ILS MISSSED APPROACH* pull-out now straight-ahead on back course to 3,500', then AVP VOR.

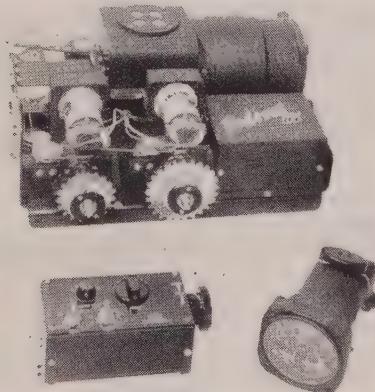
reported at or more than 2,600 feet. The ceiling report is *not* a limitation: the legal minimum is RVR 2,600' or more, regardless of reported ceiling. If the pilot can see the approach lights on reaching his minimum altitude, he is then legal to complete the landing.

At least for the time being, RVR will not be used as the basis for dispatching, but may be used for diversion of flights already in or closely approaching the metropolitan area.

The application of this new "minimum" is similar to the "look-see" procedure whereby when a pilot has passed the outer marker at the time the airport weather is first reported below minimums, he may continue let-down to his minimums provided both ILS and GCA are operational and he employs both.

Tubeless, Transistorless Autopilot by Federal

An autopilot, whose simplicity represents a startling and challenging reversal of conventional aircraft electronic design using no tubes or transistors and selling for under \$2,000,



has been demonstrated in flight by the Federal Telephone and Radio Co., a division of International Telephone and Telegraph Corp.

Designed for use in light or medium-weight private and business aircraft, it is approximately the size of a portable typewriter and weighs only 17 lbs. Federal points out that previously-available two-axis control equipment has become increasingly complex, featuring increased use of tubes and associated electronic circuitry, and has become prohibitively expensive. A not too satisfying approach to this problem is represented by the limited, single-axis control systems now on the market. Federal offers their answers in the first real applications of tubeless philosophy to the small aircraft field.

Since the autopilot does not employ tubes, the problem of in-flight performance failure is reduced substantially. Its tubeless operation eliminates warm-up time and stand-by power drain. Optimum performance is there-

fore available immediately on switch-over in the event of emergency or other immediate requirements. The elimination of tubes permits a compact, simple and rugged design, easy to install and maintain with the added advantage of low power consumption.

The equipment has been designated as the FTR Autopilot System. It is available in two models—F200 and F300. The F200 model weighs 17 lbs uninstalled, and is a 2-axis unit for single-engined aircraft which have coordinated ailerons and rudder. It has a domestic list price of \$1,995. The F300 model weighs 19 lbs uninstalled, and is a 3-axis model for two-engined planes or for single-engine planes with uncoordinated ailerons and rudder. It has a domestic list price of \$2,325. The weight of either of the two models, when installed, varies from approximately 21 to 25 lbs, depending on the make and model of the plane.

The Autopilot consists of a gyro-servo assembly, a control unit, and a turn-and-bank indicator. This system permits selection of roll or pitch stabilization or both, giving positive control at all times. The system is also capable of being adapted to accept control signals from a radio coupler, controlling both radio range and ILS systems. Altitude control is also promised as optional equipment. The autopilot operates on either a 12- or 24-volt input and there is, effectively, no power consumption when the system is at null. When the aircraft is in smooth, stabilized flight the autopilot is actually not working, but goes to work instantly when turbulent air, the human pilot, or any other factor produces a change or unbalance.

In operation, the actual position of the aircraft is sensed by a turn-and-bank unit and roll and pitch units of the gyro-horizon assembly which is part of the gyro-servo assembly. Each of these units contains a set of electrical pickoffs which, for normal level flight, are centered and thus off.

Various factors, such as rough air or moving the knobs of the autopilot control, can cause a pickoff to move off center and thus operate one of the relays. When this happens, the relay applies current to the servo system to drive the appropriate control surfaces in a direction which will so move the aircraft that the pickoffs will be moved back towards center. Thus the pick-offs provide a position sense condition which keeps the aircraft in a desired flight attitude. This condition is satisfied only when pickoffs centered.

The gyro-servo assembly, heart of the unit, is ordinarily installed in the fuselage, aft of the baggage compartment, and is connected to the control unit which is mounted on the control pedestal or on the instrument panel.

The gyro-servo unit is 15" long, 11 $\frac{1}{8}$ " wide, and 16 $\frac{1}{8}$ " high. The control unit consists of a manual "turn" control, a manual "pitch" control, a manual "course trim" control, and two on-off "roll" and "pitch" switches. These switches permit selection of roll or pitch stabilization individually or together, giving positive control at all times. The control unit is only 4" wide, 3 $\frac{3}{4}$ " deep and 3 $\frac{1}{2}$ " high.

The turn-bank indicator (replacing the airplane's normal t & b) fits conventionally on the instrument panel where it is used as an autopilot sensing unit and as a standard visual flight instrument. It is 3" high, 3" wide and 6 $\frac{1}{16}$ " long. The autopilot will be distributed throughout the United States by the Federal company's nationwide distribution organization.

New ARC 'Miniaturized' ADF Weighs 19.1 lbs

The new miniature ADF or radio compass, weighing 19.1 lbs, announced by Aircraft Radio Corp. of Boonton, N. J., is a 3-band superheterodyne receiver, complete with power unit, receiver, control unit, indicator, loop, housing and all connectors. The Type-21 ADF provides reception of and direction on low-frequency range and commercial broadcast stations in the 190 to 1,750 kc bands.

The hermetically-sealed loop-assembly external housing extends only 2"

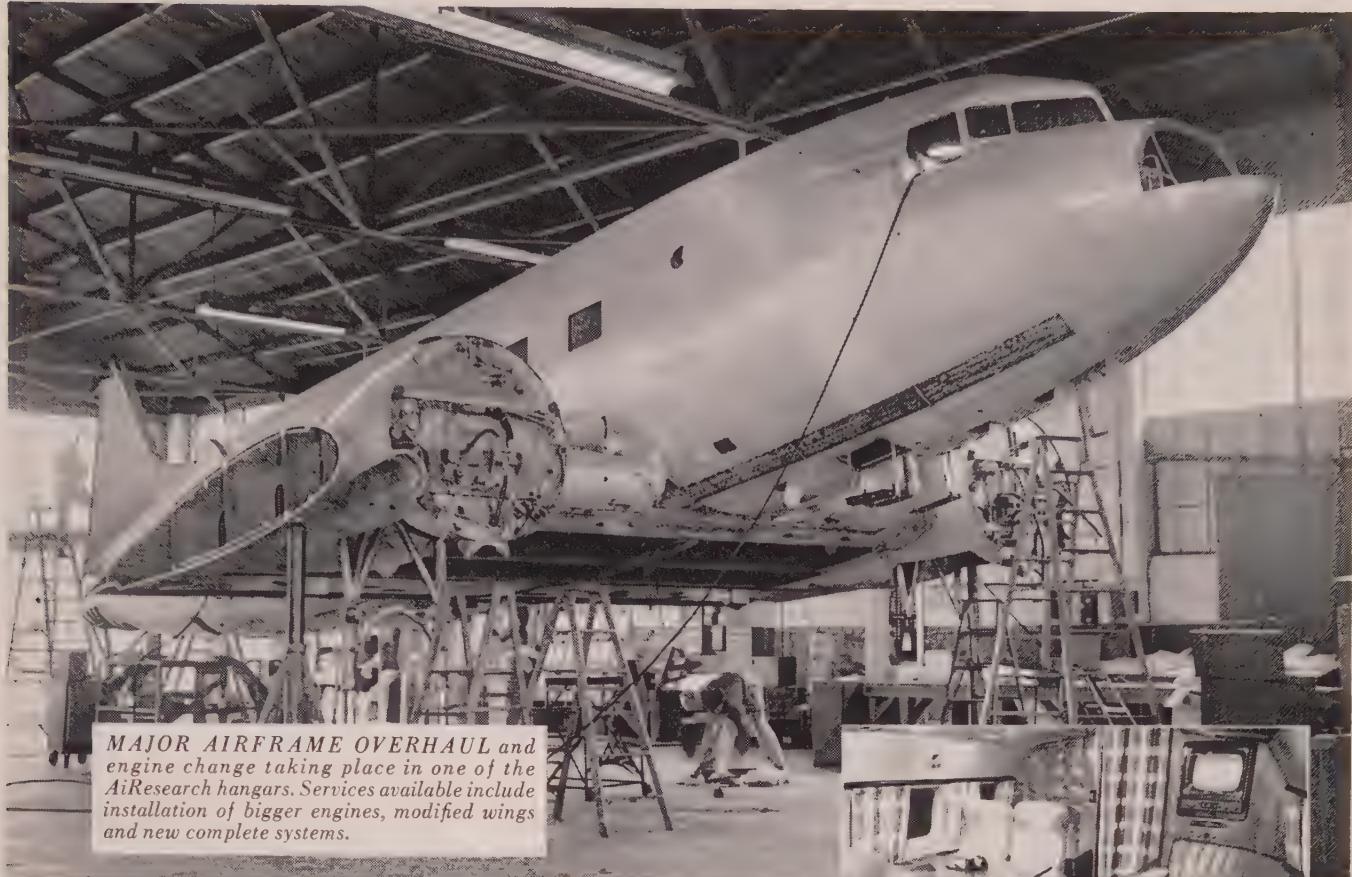


beyond the skin of the aircraft and requires such a small hole in the skin that additional skin stiffeners (extra weight) are not required, as would be the case with truly "flush" mounted loops. The unit has provisions for compensation of as much as 25° of compass error due to aircraft structure and other influences causing local field distortion. A total of 14 error-correcting screws are provided. The housings supplied are made of anti-precipitation static material.

With 14 premium-type sub-miniature vacuum tubes operating well below their rated continuous output, sensitivity and selectivity are claimed to be fully comparable to that in equipment currently weighing three times as much and more costly. "Solid"

(Continued on page 44)

Every overhaul requirement for your business airplane!



MAJOR AIRFRAME OVERHAUL and engine change taking place in one of the AiResearch hangars. Services available include installation of bigger engines, modified wings and new complete systems.

Let our specialists maintain your business airplane in top condition. Experienced mechanics provide every aspect of aircraft servicing, from thorough 100-hour checks to complete modernization. AiResearch is the only company at Los Angeles International Airport with CAA approval for annual relicensing of your airplane.

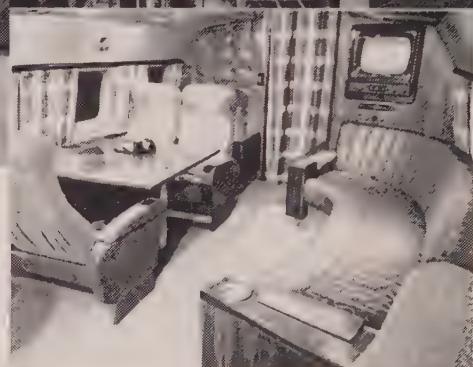
A complete engineering department, the finest interior stylists and superb craftsmanship assure you of top quality if your problem is comfort, speed, range, payload, power or all five.

Try our rapid and efficient turn-around service!

TYPICAL AIRCRAFT WE HAVE MODIFIED OR OVERHAULED:
Douglas DC-3, Super DC-3,
DC-4, DC-6 and A-26 —
Convair 340 — Lockheed
Lodestar — North American B-25
— Martin B-26 — Beechcraft

WEATHER RADAR SYSTEMS

Specially developed AiResearch nose modification kit and radome for DC-3 gives better picture definition with no airspeed loss. RCA, Collins or Bendix X-Band or C-Band radar units installed in DC-3, Lodestar and Convair airliners. Send for booklet R-1.



BEAUTIFUL CUSTOM INTERIOR installed by AiResearch in a Convair 340 owned by the Phillips Petroleum Company. Handsome appointments are combined with practicality.



NEW RADIO AND ELECTRONICS CENTER has most complete facilities in the nation for business aircraft. CAA certified for Class I, II and III.

THE GARRETT CORPORATION

AiResearch Aviation Service Division
Los Angeles International Airport, Los Angeles 45, California



Official

NBAA Report

NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC.

(formerly Corporation Aircraft Owners' Association)

National Business Aircraft Association, Inc. is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable business aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. NBAA National Headquarters are located at Pennsylvania Building, Suite 344, 13th & Pennsylvania Avenue, N.W., Washington 4, D.C. Phone: National 8-0804.

'Business Week' Article Draws Remmert-Werner Ire

NBAA member, Remmert-Werner, Inc., Lambert Field, St. Louis, Mo., recently took strong exception to an article "Planning Business Aviation, Maintenance and Operations," which appeared in a well-known national weekly magazine. Although the article mentioned is not reproduced here, it is believed that the letter quoted below is sufficiently clear to indicate the inferences contained in it. It is NBAA's firm view that articles which do not present a true picture of business aircraft operations only contribute to confusion and misunderstanding of this largest and most rapidly growing segment of civil aviation. Ample factual material is available from our Association, from the CAA, CAB, AIA, and other reliable sources, on the history, development, safety, operation, maintenance, and expansion of business flying. Remmert-Werner had this to say in their letter:

"Business Week's March 24, 1956, personal business piece on executive aircraft maintenance was out of line, and not to be expected from the same publishing house that prints Aviation Week, a leader in its field. Your information is grossly inaccurate both in general impression and in specific detail, and performs a serious disservice to those readers who either have or are considering business aircraft. You have either been imposed upon with some loaded information, or have severely misquoted your source."

"While some individual companies do cut corners on maintenance costs, through ignorance or false economy, their number is too few to justify any such blanket indictment as yours. Very few executives or their pilots show any inclination to com-

promise their own safety for whatever immediate cash saving they might make. If the average business plane 'maintenance program would make an airline official shudder,' it is more likely to be from envy than apprehension.

"Justification for our opinion is our 10 years of experience, during the growth of business aviation, in converting over 100 airline DC-3 and military C-47 aircraft to executive DC-3, converting, maintaining, and overhauling hundreds of other multi-engine aircraft on a regular basis, as well as many transient aircraft intermittently, and working with hundreds of their pilots and executive passengers. We have found in that time that executive aircraft maintenance on the whole is superior to airline or military, and unhampered by airline economic considerations or military expediency. What experience is the justification for your article, its writer, or his source?

"It is not 'good business for companies to impose standards of operation and maintenance similar to those designed for air carriers.' There is little similarity of operation or requirements between air carrier maintenance, equipment, personnel, or very much of anything else, and those of business aircraft. Executives fly different types of schedules in different types of aircraft to different types of airports, and generally require more and better equipment, and different and more varied types of pilot training and experience. For instance, the airlines serve fewer than 600 cities in the U. S., while business aircraft use over 6,000 airports.

"Your phrase 'tragic loss of life among executives' is a gross distortion and exaggeration. A four-year average by the National Safety Council shows 0.49 fatalities per 100 million passenger miles for business aircraft, compared to 1.03 for domestic airlines, and 2.85 for autos. Publicity value of the name of the average executive passenger is better than that of the average airline passenger, but the executive passenger is still safer in his own plane than in his own car or an airliner.

"You quote 'CAA statistics' inaccurately, comparing a '72%' of 'executive' flying accidents as being 'considerably higher than the 47% of commercial accidents.' This is like comparing autos with busses. The 47% commercial figure includes only professional pilots, extensively trained, in constant practice, flying professional equipment, with professional and complete ground radio and electronic aids. The

'72%' covers all executive flying accidents, including not only the equally well qualified professional business pilot, but also the amateur-pilot executive, with limited aviation background and flight experience, who flies his own or company plane on his own business trip into 5,400 more airports than the airlines do, and has something else on his mind at the same time. In 1954, of 2,080 multi-engine business planes only 320 were flown by the businessman himself, with the other 1,760 flown by professional pilots. Of 16,480 single-engine planes, 14,760 were flown by the executive himself, with only 1,720 flown by professionals. It is ridiculous to compare the record of the full-time professional airline pilot with that of the occasional, amateur, part-time pilot, as you have done instead of on an equal basis with the full-time professional business pilot.

"Your complaint of 'lack of government regulations' covering private planes is similarly ill-founded on several counts. The CAA for years has provided minimum requirements and regulations more than sufficient for safety, with such satisfactory results that maintenance as a cause of aircraft accidents is a negligible consideration, with weather the overwhelming factor. Even so, few executive aircraft pilots or operators will accept 'minimum' standards, and spare no expense to meet their own standards over and above CAA requirements. If Business Week is concerned about 'lack of government regulations,' it will be interested to note that in recent months the Department of Commerce is endeavoring to eliminate much of the regulation that does exist, and to remove supervision of private aircraft maintenance from the CAA, assigning responsibility for the condition of the aircraft to the private owner. This is presumably in line with Administration policy, often favored by Business Week, to 'reduce government interference with the rights of private business.' If, as you protest, 'companies have practically a free hand in setting standards,' it seems to be all right with the Department of Commerce.

"Contrary to your next statement, the pilot *does* have final authority, specifically vested in him by CAA regulations, on any operation, maintenance, condition, or flight of the aircraft. If an individual pilot does not exercise this authority, no amount of regulation or company aviation programs will make him do so. A pilot who cannot say 'no' to an undesirable flight or condition is not qualified for his position, nor is any executive who tries to pressure him into it.

"Key to the problem of increasing the safety factor of business flying' is *not* responsibility of the executives, and *not* 'every company owning an airplane should establish its own aviation program with an executive in charge.' Successful operation of a company aviation program depends on practical experience and technical knowledge quite beyond the scope or easy acquisition of any busy executive with a non-aviation background, and should properly be the responsibility of a chief pilot who knows and understands the limitations and capabilities of pilots and planes and their fields of operation, and who has the authority and duty to say 'no.' An aviation department under charge of an un-

qualified executive is likely to deny the pilot the very final authority he needs—and will demand—for safety and efficiency. The executive is no more qualified to run an aviation operation than the pilot is qualified to run the administration of the company.

"There are poor pilots, of course, but there are also poor executives, poor consultants, and poor magazine articles. Business aviation doesn't need 'higher qualifications' for its pilots nearly as much as its new users need less confusion and misinformation from such irresponsible articles, and from would-be middlemen, brokers, or 'consultants' who are either totally unqualified or whose 'experience' lies in an unrelated field such as airline operations.

"We believe an explanation is due from Business Week to the owners, operators, pilots, and passengers of this country's 13,000 company aircraft. Such casual, sloppy reporting, with obvious failure to check accuracy of information or motive of source, is unworthy of a publication of the stature of Business Week, and, to those familiar with the subject, casts reflections and doubts on the quality or value of your articles on other topics."

NBAA Member Tells Near-Miss Incident, Asks Action

The danger of mid-air collision is of growing concern to business, airline, private, and military aircraft operators. Some of the top aviation experts of our nation are presently devoting considerable time and effort to seeking a solution to this serious problem. NBAA is active on several committees studying the situation and will keep you informed of progress from time to time.

In this connection, one of our leading member-pilots recently sent us a report on a "near miss" that is representative of others that are occurring almost daily. Excerpts are quoted for your information.

"On March 27, 1956, at 1800 hours, I became airborne at Sarasota, Fla., flying a DC-3, with three passengers aboard, one a top executive of my company.

"A DVFR flight plan was filed with Tampa Radio on climb-out at Sarasota, requesting 5,000 ft. V152S-V5-V3-V1-V157-A7 to DCA. The weather at that time over the entire route was given as clear with high thin broken to scattered with smoke from forest fires, restricting visibility in spots. On approaching Jacksonville, we climbed VFR to 7,000 and advised JAX we were doing so on account of smoke. We maintained 7,000 ft. until we reached Rocky Mount, N.C., and began a descent to 5,000 and Rocky Mount was advised. At no time during our flight was visibility less than 10 miles. Upon approaching a position 20 nautical miles south of Lawrenceville, N.C., we noticed an aircraft about eight miles ahead, approaching our aircraft on a southerly heading, and appeared to be about 4,000 ft. This aircraft was equipped with a rotating beacon light and a red nose position light. Our DC-3 is equipped with a 50-watt red seal-beam nose-position light, a 100-watt seal-beam rotating beacon mounted on top of the fin, two white 50-candlepower flashing

navigation lights on top and bottom of the fuselage, and the wing lights are the new large type of Grimes lights with 50-candle-power reflector bulbs. Our landing lights are the new type seal-beam 600-watt lights. Our wing ice lights are also 50-watt seal-beam lights.

"After watching the approaching aircraft a few seconds, my co-pilot remarked, 'What is that guy trying to do?' From our position, it appeared as if he was uncertain as to where he was going. First, he took up a southeasterly course, then turned to a southwesterly heading, at the same time we maintained 5,000 ft., turning opposite his turns so as not to intercept his flight path. His next change of heading was to a southeasterly direction. At this time, it appeared that he had climbed a couple of hundred feet and it appeared that he would pass to our right and about 800 feet below us. Then suddenly, this aircraft made an abrupt climb and turned in our direction at our level. This movement so startled us both that three or four seconds must have passed, and at the same time we were trying to figure out what next. My reflexes jerked the control wheel back and we almost climbed vertically. This unknown aircraft passed underneath so close that we heard the roar and swish as it passed under us. At such close range, I identified this airplane as a twin-engine airplane of Twin Beech size. At this point, my employer who was working at his desk table, asked what was going on.

"Going back a bit, I would like to explain that during the erratic flying of this unknown aircraft, I flashed my landing lights on 3 or 4 times and they were left on for several seconds at a time; at no time did I receive an acknowledgment from him. I would like to add further that my wife has been flying with me on occasional trips for the past eight years and is definitely not the excitable type. Her position in the cabin was on the right side on the couch by a table lamp. She has stated that when she looked out the window on the right side, she saw the nose of the aircraft before it disappeared under our right wing, and she immediately jumped to the opposite side and watched him continue his climb after passing underneath us. I would also like to state that this aircraft had no wing lights burning. After it had passed underneath, I turned enough to observe it continue its erratic climb to about 6,000 ft.

"We immediately contacted Rocky Mount radio and reported this and requested any information possible. Before Rocky Mount could obtain any information, we had passed out of receiver range. We then contacted Richmond Radio and was informed that the only known traffic in the area was a Twin Beech. The exact time of this near collision was 2151 E, visibility clear and full moon. My wife has stated that she thinks that if she sees this aircraft again that she can identify it. She further states that this aircraft appeared to be aluminum finish with a dark nose and a dark design of some type on the side or a light color paint with the same dark scheme.

"I realize that tracking down this airplane will be like looking for a needle in a haystack. Also, I am of the firm opinion

that the time has long passed for the re-writing of present rules and regulations for air traffic. I also strongly recommend that the safety agents throughout the country should be encouraged to make trips with executive aircraft to see first hand what is occurring, and upon their recommendation, get laws written with teeth in them. As you know, a modern streamlined country cannot be run with antique laws.

"For record information, I have held an airline transport rating since 1946, have flown as airline captain for both domestic and transatlantic, have experience on approximately 122 types of aircraft and have approximately 11,500 hours flying time and have been flying since 1932 without an accident. My co-pilot is in possession of a commercial license and instrument rating, and has 5,000 hours of flying time. My current 1st class physical was taken March 13, 1956, and has no limitations.

"I would like to state that it would have been impossible for our DC-3 not to have been seen had a competent person been at the controls of this unknown aircraft."

FCC Plans Rule Change to Require Tall-Tower Grouping

The Federal Communications Commission has proposed an amendment to its rules to conform with recommendations of the Joint Industry-Government Tall Structures Committee on grouping and location of antenna towers to reduce hazards to air navigation. NBAA was an industry member of this committee.

The recommendations, previously approved by the Air Coordinating Committee, requires grouping of antenna towers whose height is 500 feet or more above ground, and also multiple-use of existing structures for such antennas, in areas designated by the ACC Airspace Panel, which are acceptable from an aeronautical viewpoint.

Under the proposed rules, applications for permits to construct new radio and TV stations or to change locations of existing ones, would not be approved unless the grouping and location rules are met, or adequate justification has been submitted showing that they cannot be met and the proposed structure will not constitute a hazard to air navigation.

Figures Show Business Aviation Growth Since '47

Business flying, according to the CAA, is by far the major segment of general aviation flight activity and it accounted for 45% of all general aviation flying hours in 1955. The term "business flying" as used by CAA covers flying by corporations, companies or individuals in carrying out in their own aircraft the operations of their given enterprises or professions. It represents the use of an aircraft as a vehicle of transportation for people and cargo, not for compensation, in the manner a company or individual might use his own auto or truck.

Business flying has had a record of consistent growth throughout the postwar period. Between 1947 and 1955, the number of hours flown in business flying more than

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Round Table

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criticism, to say the least, as to the practicability of applying these standards at almost every airport of any size in the United States. There could really be no technical argument with the suggested standards, because anybody realizes that a crash fire is just as hot at Idlewild as it is at the Allentown-Bethlehem-Easton airport. Complicating the practical problem of equipment purchase, is the securing of trained personnel. This becomes costly at any airport, and especially at medium and smaller-sized airports.

"I think the committee's work stimulated all the members. In our case, it made us look again at our own airport. At the Allentown-Bethlehem-Easton Airport — a rather unique operation since it is governed by an authority created by three cities and two counties—we got some interesting cooperation not only from the supporting municipal fire departments but also from the airport users. Our fire and crash crew is made up entirely of volunteers. As yet, we have not been able to justify full-time crews for airport fires and crash protection.

"We met recently to review our whole emergency procedure. Attending were airlines' personnel and personnel of corporations who own hangars and operate airplanes. All have participated actively in our training program. Two companies own their own hangars. They encouraged their men to participate in the training programs and have furnished equipment; in one case a hangar tug equipped with a 150-pound dry-chemical unit, which has, on two occasions, prevented small fires from becoming major ones.

"Airport fire protection is a joint problem. It is not solely the airlines' responsibility. An airport the size we are talking about involves all users, including the base operator. Our incidents prove that interest and enthusiasm for such a program can be developed. It needs somebody to coordinate it. We feel that responsibility goes to airport management.

"About liability of volunteer workers. Our airport carries public-liability and property-damage insurance. The airlines were reluctant that their personnel serve without some liability protection. Our insurance carrier wrote a provision to cover them. It simply states that, 'When the airlines employees are acting for the airport manager or his representatives prior to his arrival, their activities shall be deemed as emergency volunteer service and the airport shall protect them from any liabilities therefrom, except for willful misconduct.' That endorsement costs less than \$10 a year."

John Groves (Air Transport Association of America): "What do you mean by 'prior to his arrival'?"

Wilfred M. Post, Jr.: "Often, in an airport our size, the manager or his representative might not be on duty at the time of an accident."

John Groves: "Well he's not protected after the manager's arrival."

Wilfred M. Post, Jr.: "At that time the airport manager or his representative will take over and assume the responsibility."

Jerry Lederer: "What about workman's

compensation? Suppose one of the men is injured?"

Wilfred M. Post, Jr.: "All the airlines that operate from our airport, I believe, cover their men not only for actual emergencies, but also for their training programs."

Jerry Lederer: "And what about your own people, the base operators?"

Wilfred M. Post, Jr.: "The same is true. Recently I saw an airline bulletin to station managers. It advised that all chop marks had been removed from the airline's airplanes. We couldn't understand it in view of all the efforts made in the recent years by airlines to put chop markings on their airplanes."

Jerry Lederer: "May I comment on that? There is feeling that chop marks are so small that when you put foam on the fuselage it will conceal them anyway. But I had in mind the smaller airplanes where the owner would not be afraid to put on a big arrow, not saying 'Rescue,' but 'Welcome!' The military is putting big arrows on theirs, but the airlines never would."

Hervey Law (The Port of New York Authority): "I would like to comment on chop marks. I contend that the small marks put on aircraft are not too valuable when you are actually fighting a fire with foam; they would be covered up. Therefore, I think that they should be prominently marked with, if necessary, a two-inch band around the four sides. Of course the airlines are not in favor of that. However, it seems that these marks could be worked into the general scheme of an aircraft's external decorations. Fire and rescue crews would, of course, be informed."

"It is interesting to note that in all military tests, experiments or motion pictures that I have seen, wherein they show the use of circular metal saws or firemen's axes for gaining entrance to a disabled aircraft, there has been a big band to guide the fellow who was cutting. I have never seen any that didn't show that band."

"It seems to me to be shortsightedness on the part not only of the airlines but any other aircraft owners, executive, private or what have you, that they should oppose exterior markings. It could mean life or death to somebody inside. That is very important, and I think we should continue to stress its importance to the regulatory bodies, CAB and CAA, and to the airlines."

Douglas C. Wolfe: "I question whether the intent of this meeting is to go over these things."

Alfred L. Wolf (Aircraft Owners & Pilots Association): "I sense in the chair a desire for some original thinking on this crash rescue problem. I am peculiarly unhampered by any knowledge of the problem, so I can speak quite freely. I may have some new ideas that probably are not too good. I have crashed frequently enough, but, thankfully, I haven't burned yet."

"I think, to answer Mr. Lederer's general appeal for a financial means of handling the situation at the smallest of the small airports—airports not necessarily equipped with towers—a very easy method which would prove immensely practical would be to approach your local volunteer fire department and say, 'Gentlemen, you have a valuable tract of land here in the

middle of town. Why don't you sell it. Get \$125,000-\$130,000 for it, and your building, then move down here onto our airport. We'd love to have you; you'd be very comfortable. We'll provide you a lot of space for your meetings; you'll have lots of chance to practice; and we'll have a lot of attractions for you."

"Life would be much happier for the guy who runs it, because he's bored as all-get-out where he is, and he also has only one school to go to at the county's expense right now. He presently goes to the States' School for Firemen. But if he or any of his colleagues that have spare time could go to school at Lowry Field, Denver, I'm sure the Air Force would welcome them."

"All this is critical to my next subject; towerless airports. You gentlemen have been in a very small fraction of the world as we AOPA'ers know it. You've been at the airports which have not only towers, but, more curious phenomena, tower attendants. I've been on thousands of airports with towers, and have found very very few with tower attendants. I seem to be always able to tell when a tower will be unattended—it's that time when I'm going to land. At these airports you have a much more critical problem; how do you find out that a fire has occurred?

"You gentlemen know that a fatal crash occurred at LaGuardia and nobody found the people for 36 hours. If I came into Wings Field tomorrow and started burning, unless some vigilant person was watching, they'd think, 'Well, boy, they're sure burning a lot of leaves at that dump today . . . isn't that something . . . just look at that fire!' Then they'd go back to whatever they were doing in the neighborhood."

"Couldn't it be worked out that, if we came into a towerless airport and crashed, we might press a button on 122.1 or 122.5 kc and set off a siren? When a siren sets off, that really alerts small communities. Where I come from everybody starts calling the Operator, 'Where's the Fire?' Another way of handling the problem at towerless airports would be to have a plastic siren on your aircraft. If you crash, it is triggered. Either of these mechanisms would let people know that it wasn't somebody's trash heap burning."

"The local fire department has some gentleman living in it 24-hours-a-day. He probably gets tired. He wants company, and he can do two things. Firstly, he could perform a wonderful function vis-a-vis the Air Forces, which I'm familiar with, and probably the Navy or the Army. They all have very strong Reserve programs creating more firemen, or keeping them active. Why not perform a two weeks' training mission at these small fields, where a Lowry Field graduate in attendance would teach them all the latest techniques. They also could no doubt get some on-loan equipment for practice. This would give them some people. Then there's the community members—who want to learn just for the fun of the thing—and the people at the airport who want to learn how to put out fires."

"That is a very brief program to meet an economic problem. It needs one thing, a trigger, and that trigger would be the person who is going to pay the bills for a fire; the airport manager, because he is getting the fire insurance."



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Douglas C. Wolfe: "Abby, that's the question I had—who's going to pay the bill? Apparently the airport manager. Now, who is going to pay the airport manager, or give him the money to pay the bills to provide what you're talking about?"

Alfred L. Wolf: "No bills involved, in the first place."

Douglas C. Wolfe: "Do you know that foam costs \$5 a gallon?"

Alfred L. Wolf: "All practicing is done on the same basis as our local volunteer fire department. You and I are paying in the small community today for whatever the local fire department does. I've watched them work and they're good."

Douglas C. Wolfe: "I've been trying to work with a fire department made up of volunteers from the Airlines. It hasn't worked, because on a local basis it's almost impossible to get the complete cooperation you need. In fact, as I think back to the volunteer fire departments that I know of, they all had internal problems. Who gets to be chief? That's a fact! Volunteer fire departments have an awful problem. Besides training a volunteer fire department on a class-A fire, such as a house would be, is entirely different from training them to fight an aircraft fire.

"Moreover there are no facilities available, like training aids, to help us. Even the manufacturers are reluctant to give us any help on how to cut into an airplane, or where the gas tanks are. If it weren't for the Flight Safety Foundation and NFPA, there would be little of that information available. Airlines are interested in this problem, and John Groves and I have talked about it many times. John, will you give us the ATA position on this problem of providing protection or allowing airline people to participate as volunteers?"

John Groves (Air Transport Association): "I can't give a firm policy, but I can say some things that will partially answer your question. I think, in the last year or so, we have looked at the problem more realistically. Originally we thought, 'This is a responsibility of the airport management. He should provide fire-fighting facilities and the people to man apparatus. He should also undertake training programs utilizing largely personnel other than airline personnel stationed on the airport.'

"I think the reason for that was quite evident. We felt that it was something we were paying for and that there were questions as to our legality in using our own employees on other than our aircraft, insofar as workman's compensation, insurance, liability for damage to other people's property, and even improper functioning that might cause loss of life and property were concerned. However, I think recently we have looked upon this thing a little differently. We now feel that our personnel, on a voluntary basis, should be available to function as part of the volunteer fire brigade—crash brigade—and that it should be mostly a deal between interested individuals and the airport management.

"One of our big troubles in participating lies in the fact that we transfer people so much. Also, at some of our smaller stations we have a couple of guys up on the ticket counter, maybe a girl, and we have a couple of guys on the line. Perhaps we don't operate around the clock, so they

aren't always available. So, when the horn blows, you don't have any airline volunteers. I don't think that is insurmountable. I think that can be worked out individually at individual airports. And on the whole, I think you'll get ATA and airline industry support on that basis.

"I think that there should be some national program established, if possible, whereby we could get some standardization on means for combating this problem, of solving it, and of providing the sort of equipment we need. There's nothing worse than to get a bunch of unqualified people around an airplane crash, trying to do a job with nobody knowing what the devil he's doing. I think that training is essential. Just because a person says, 'I want to be a volunteer fireman,' doesn't mean he necessarily has the proper approach to be effective. I think you have to screen them out. We have to find the type of people that can be counted on to follow direction and to meet an emergency. You don't get much practice at this thing. You can practice with foam, but when you get down to an actual emergency, you have never had any practice at that.

"One word about chop marks. I think our first responsibility as far as airlines are concerned is to get people out of the airplane. We feel that, with regular means of egress from the airplane and with the emergency exits and so forth, the evacuation chutes and ropes and ladders, we'll get our people out better through these exits than by trying to chop holes through airplanes, because, believe me, it's a rough job. Unless you've had a lot of experience, you don't know what you're chopping, what tool you're using, or how you're going to get through. You don't take a fire axe, believe me, and chop through an airplane. You use a specially-designed saw, and this may not be available. So I think, that while chop marks certainly do no harm, we should work on the basis that we use what is available in the line of regular and emergency exits to evacuate people.

"I think the original evacuation responsibility and procedures rest with the flight crew. With proper air-carrier discipline you can get a start, because you're going to be out there under emergency conditions with women with babes in arms and old people. It isn't like having well-disciplined people such as in the military—or in many non-airline civil operations where you have people who are aware of the problem, who understand the hazards involved, and who can take care of themselves.

"I'm sure that the airlines can cooperate and find a solution, but we have to get into it on a national basis, with proper AOC, AAAE and National Fire Prevention Association representation."

Douglas C. Wolfe: "John, what you've said is the first sign of hope I've experienced with the airlines in the three years that I've been working on the problem. In my opinion there definitely is no answer to this problem except on a national scale.

"Abby, you suggest sending these people to, perhaps, Lowry Field. Do you know that as far as Air Force is concerned, my problem at my airport is so unimportant that I can't even get their training manuals; they are restricted."

Jerry Lederer: "How many military air-

plane operations do you have a month?"

Douglas C. Wolfe: "We run about 200 a month now, as I recall. I went to the Air Force for assistance for training purposes, but my field wasn't a 'designated' or 'recognized' military base, so they could offer no training aids to train my volunteers to help if a military plane had an accident on the field."

"That's why my goal on this thing has always been a nation-wide, industry-wide plan. I'd like very much to send my department chief, who has had little training on airport crashes, through the Navy courses or those of the other services.

"In my opinion, responsibility for providing airport crash equipment and the personnel to operate it has no home. The airport manager or the airport owner has no greater responsibility nor greater part of the responsibility in providing the equipment than the airlines or the executive operator or the fixed-base operator have. I don't think there's any question that the administrative responsibility for it should fall on the airport manager, but that it is a cooperative thing among everyone.

"There are two lawsuits pending, where the claimants are suing the airport owner on allegations that the airport was negligent, because it failed to have adequate crash equipment available. The possibility of legislation constantly comes up. Perhaps, if plaintiff in one of these two suits wins, the responsibility will be pinned on the airport and the owner.

"Several airport managers have told me that they're not worried about having emergency equipment because they carry sufficient liability insurance. If they had an accident and they were liable, the insurance company would take care of the suit, or the loss. That certainly should interest the insurance companies. What about that, Clarence?"

Clarence C. Pell, Jr. (Marine Office of America): "There's nothing insurance companies hate worse than toasted people! Anything that can reasonably be done by the insurance companies, insofar as liability insurance for the airport operators or compensation insurance for the airline clerks and employees are concerned, they would certainly do.

"They already have all the necessary association to meet a problem like this. It's just a matter of presenting it to them and saying, 'Here is a problem; here is what the airports and the airlines and executive operators want to do. Will you endorse our compensation policies to take care of the additional duties that may fall on an airline clerk, or an airport operator in case he's burned or injured during such a rescue?' There's no difficulty, except the one of presenting it, to get the coverage. Mr. Post has the coverage. If an airline insured by us told us of this problem and said this is what we want, we wouldn't hesitate to give it to them. Further—I'm not a compensation expert, but I checked with our compensation people today—if, in a rescue at your airport, an airline employee went out and was injured, their compensation would take care of him, even though it was not a specified duty for him."

Douglas C. Wolfe: "He would be covered?"

Clarence C. Pell, Jr.: "Well, we would

hold him covered. I speak for the Associated Aviation Underwriters in that respect. I can't speak for other insurers because I don't know what they would do, but I would certainly assume that they would follow the same pattern."

Jerry Lederer: "I'd like to pin you down on the point raised by Doug, that the airport manager needn't provide protection because he's insured. I didn't quite understand your reaction to that?"

Douglas C. Wolfe: "Let's assume the airport we were talking about loses the suit and the insurance company has to pay \$300,000. How would the insurance company feel then about adequacy of equipment on airports?"

Clarence C. Pell, Jr.: "I think that we would thereafter look at airport liability insurance a great deal more closely. And then, immediately we would seek to eliminate that cause of loss. Insurance companies have so many terrible things that can happen to them that they can't think of all of them. They, therefore, look after the principal problems that they know about."

"If this case states that the airport is negligent in not providing fire equipment, the underwriting on airports is going to change around. They're going to see that airports have fire equipment."

Douglas C. Wolfe: "Why wouldn't it be better to get the insurance companies to help in this problem before it gets to that stage?"

"There's one large community in Texas that has an old piece of fire equipment. According to the CAA facility charts they list fire equipment. Also they have a paid fire department that meets the specifications or the standards as set up by NFPA. But the men at the airport are the men that can't get along downtown. Now, you've got a fire department—it's listed in the books—but yet it's not . . . it's . . ."

Clarence C. Pell, Jr.: "It's useless!"

Douglas C. Wolfe: "At Broome County we have tried to develop an efficient fire department with volunteer personnel; but we have not been able to get complete assistance from any organization, be it airline, fixed-base operators, military—no one is interested in our particular problem except ourselves."

Clarence C. Pell, Jr.: "Joe Chase has talked to me several times about this problem of yours and the corollary insurance problems, and I think that I have consistently given him the same answer. The suggestion has been that this should be presented, as far as the insurance industry is concerned, to the National Board of Casualty and Surety Underwriters. They have a safety section and a rating section. They represent all the stock insurance companies, and I'm sure that they have a committee where this problem could be quite quickly straightened out."

Douglas C. Wolfe: "I may be unduly alarmed about the possibility of legislation ever being passed that would require equipment on airports; then I don't see how it could ever be done. Mr. Bakke, would you . . .?"

Clarence C. Pell, Jr.: "May I say one more thing. It seems to me that at these airports there are separate gasoline and other concessions. Maybe the oil industry

could be interested in this problem."

Douglas C. Wolfe: "That's what I'm looking for, help to make this department I have better."

Wilfred M. Post, Jr.: "It's obvious that at most airports the program is going to be essentially volunteer, and has to be. There's no question that training is the key to such operations. I think, then, that the most important subject is, somehow or other, to devise an adequate training course. I believe that NFPA is considering the gathering of material that could be put in a book or pamphlet guide for training. It would be for your airport personnel, for the volunteers and for some of the full-time city firemen. We have found that munici-

pal fire departments are very interested in learning something about handling aircraft fires."

John Groves: "I'd like to hear from Mr. Bakke."

Oscar Bakke (Civil Aeronautics Board): "I have just a few comments. Perhaps the most significant relates to the legislation question. First, I don't think we have to look far for the legislative authority to tackle this question. I think it already exists in Section 606 of the Civil Aeronautics Act. The Board—or rather, the old Authority—having been given the power to rate, inspect, classify and to certificate air navigation facilities, including airports, has ample legislative authority to proceed with a pro-

Royal AMPHIBIAN NEWS



Notes on America's outstanding utility amphibian for business flying and charter service operation

3 NEW ROYAL GULLS REPLACE SINGLE ENGINE PLANES TO HELP SPEED "DEW" LINE CONSTRUCTION



JACK GRAHAM, right, manager of Timmins Aviation Ltd., and Max I. Black, manager of Royal Aircraft, check map of remote areas over which Geolaire's new Royal Gulls will be flying.

Montreal, Canada—Three Royal Gulls will be used in support of the DEW line (Distant Early Warning) system which is currently being constructed to provide a primary source of radar warning for the defense of continental North America.

Geolaire, Ltd., with headquarters in Toronto, recently purchased the three twin-engine amphibians from Timmins Aviation Ltd., Royal Aircraft's Canadian distributor. The planes will be used to transport personnel and materials needed in establishing the radar centers.

Geolaire, Ltd. selected the Royal Gull as the most suitable aircraft for the assignment because of its load carrying capacity, long range and amphibian features. Formerly, single-engine float planes were used wherever water landings were possible. But, as construction moved north, it became apparent that it was too dangerous to rely on this type of plane.

EXPECTS GULLS TO BECOME POPULAR AIR WORK-HORSE

When in Milwaukee to arrange delivery details on the Royal Gulls for Geolaire, Jack Graham predicted the Gulls would play an important role in many businesses.

In his opinion, the Royal Gull will find wide usage among mining groups, surveying crews and resorts using charter air service. He also feels that these planes are ideal for ferrying businessmen and as liaison ships for construction projects in distant areas.

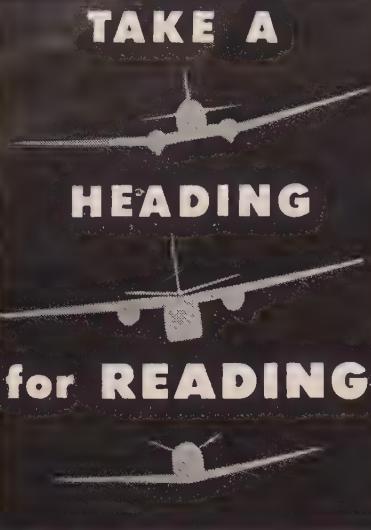
He cited the Gull's rugged construction and proven performance despite temperatures as low as 30 degrees below zero.

Timmins Aviation, he added, intends to stock all expendable parts in Montreal to provide ready service for all Royal Gulls operating in the Dominion.



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gram that might provide for such things as fire-protection facilities. In fact, Abby's friend and cohort, Merrill Armour, recently wrote in one of our law journals a private treatise on the responsibility of the Board and the Administrator to certificate airports. He was strongly of the view that the Federal Government has been delinquent, because it has not used the authority given it under the Act.

"However, since the war, the Board has been very conscious of the fire protection problem. We know that we have approximately 550 airports which are being served by scheduled air carriers, and that there are only 50 to 75 of them where we feel at all comfortable about the fire-fighting facilities available. About six years ago, we started a program toward preparing regulations—a new part of the Civil Air Regulations—to require rescue and fire fighting facilities at airports. We put out a modest, three-page draft, written in general terms, that was mostly a plea to operators to provide facilities. The blast that we got from airport operators is still resounding in some of the halls in Washington. They want no part of any regulation at this time.

"Now, it has been suggested that there is a bit of timidity on the part of Government folk in this field. We have been asked why we didn't, nevertheless, thrust out our chests and walk bravely into this antagonistic response. The important thing is not so much the legal authority to put pen on paper and write words that have the effect of law. The important thing is the practical enforcement tool. What are we going to do when Podunk Airport tells us that they're very, very sorry, they'd love to go to bat for this type of thing but they simply don't have the money; there's nothing they can do. What recourse would the Government have? Well, through a certification process, for instance, we could say that the continued operation of Podunk Airport depends upon full compliance with all the terms of the certificates. Not having complied, they're shut down. Alpha Airlines ceases service; the town is unhappy; Alpha Airlines is unhappy; the pilots are unhappy; the airport is certainly unhappy; and what have we gained—nothing. This isn't improving aviation generally. It certainly isn't a productive step. We've asked ourselves, 'What practical tools do we have?' The dollar is the best tool I know. It does more things than perhaps any other tool that has been invented. So far as the Federal Government is concerned, the administration of the airport dollar is inextricably woven into the Federal Airport Act. Now, we've been asked whether there is some way that the Board can match its regulatory authority with this very, very practical tool. Somehow, we always found ourselves faced with a complicated administrative problem when we came to use this authority. Eventually, we abandoned our attempts to use it.

"I should like to caution you against a sort of blind fear of legislation. If legislative activity works badly, it's because you, the airport operators, the air carriers and the other users of airports and other aviation facilities have permitted it to work badly. If it is agreed here that we have a serious problem in airport rescue and fire fighting facilities, if we've been struggling

for 10 years to meet the problem and have endlessly run up blind alleys, then I say, 'By all means, let's give legislation a try, if that's the only way that it can work.' I'm not suggesting that it is the only way. But let's include legislation as one of the possible alternatives which the industry should consider. Let's weigh it honestly and objectively with the other alternatives. If it is not the best, by all means let's dismiss it. But let's not run from it constantly. It may be the only solution that we have.

"I'd like to make a couple of other remarks. Someone commented on the recent elimination of chop marks on some of the air-carrier aircraft. Many of you probably know that we recently eliminated a requirement that has for several years made the provision of chop marks on air carrier aircraft mandatory. We eliminated it because, frankly, we don't think chop marks have saved a single life, and we don't think they will. We were amazed, after an exhaustive study of the problem, to find that neither the Air Force, the Navy, the Coast Guard, or the Marines could show us a single, legitimate case of a rescue resulting from chop marks on airplanes. There was the Philadelphia accident several years ago where we saw the rather tragic spectacle of a fireman standing at the rear of the airplane trying to chop his way to save seven women who were in the back. He was only an arm's length from a service door which, if he could have gotten to it, would have opened and permitted access.

"One of the conclusions of this chop marks study is that airplanes are full of holes now; let's use them. All airplanes that have been type certificated in the last 10 years have exits operable from the outside. All aircraft types certificated from now on will have all exits so constructed. We think that when emergency exits can be made operable from the outside, either by controls built into the exits or by forcible means, chop marks will not be required. That's our thinking; if we're wrong, we'd surely appreciate the comment of any one who might think differently. But especially, we'd like to have your views fairly well substantiated.

"Almost simultaneously with the elimination of the chop mark requirement, we've promulgated a set of regulations, some of which are to become effective within a month or so and the others within the next year, dealing with the training of crews and provision of certain facilities aboard aircraft to facilitate emergency egress. We'll require things like self-contained units to light emergency exits, certain types of emergency exit markings, chutes, and handholds, and ropes. We believe that there's nothing quite as meaningful in an emergency as an airplane that can be gotten out of easily, and which is manned by a crew trained to meet the emergency situation. There are no comparable regulations for executive aircraft operators. A suggestion; possibly the insurance companies might look at the training regulations for executive aircraft crews. If they believe that this fire hazard is important, insofar as insurance rates and related insurance problems are concerned, some inducement should be made for non-air carrier crews to have training programs, and aircraft be equipped, so a minimum evacuation hazard exists.

"My last suggestion is one on which I'm clearly going overboard and outside my own field. Yet, I've at least been exposed to it. It's been mentioned that the problem of training rescue personnel at some of the small outlying airports is a very difficult one. I happen to have a reserve assignment at a military station, which I know has an excellent fire and rescue unit. I'd bet that the permanent crew at this station would be happy to share their knowledge with some 15 or 20 small private airports near Washington. Why would it be necessary to send your people to Lowry? No doubt their facilities are taxed. But if the local military fire and rescue crews have been properly and completely trained at Lowry, why not a course given locally by local personnel for all fire-fighting units serving the smaller airports in that area? If such a program generated interest among airport operators, I'm sure we'd be very happy to take it up with the military as far as we can help. I'm sure, however, that you have better channels available to you. If not, I'd be very, very happy to push it."

Douglas C. Wolfe: "Captain Brown, Would you like to comment on our subject?"

Vernon H. Brown (American Airlines): "It's comforting to us who make our living in these ovens that you fellows have been talking about to learn that so many people are working on the problem. It's a real and hair-raising problem to most of us. It seems like we've been working backwards, in that we're talking about what to do after the airplane has crashed and is burning and the people are trapped inside. I think the biggest challenge in the industry right now is in the engineering field. Many things could be done in building airplanes to make many of the ground rescue problems easier."

"For example, location and design of fuel tanks has sort of reversed during the years. Airplanes that have the best safety records insofar as crash fires are concerned, are those with the fuel outside the nacelles. That was fine on short-range aircraft, but now we have real thin wings and we're going on 2,000 and 3,000-mile jaunts. We need more fuel, so we fill up the whole wing. When we've filled the wing we pack the center section. That doesn't reduce crash-fire hazards. I don't know all the answers to these questions, but most of the problem lies in this design area."

Douglas C. Wolfe: "Captain, do you think that the airplane will ever be designed that will be completely crash and fireproof and, therefore, there'll be no need of crash equipment on airports?"

Vernon H. Brown: "No, I do not."

Douglas C. Wolfe: "Then regardless of design, we will always need airport crash equipment."

Vernon H. Brown: "That's right. But the type and the amount of crash fire equipment that you airport people need will depend upon the degree to which an airplane is designed with crash safety in mind."

Douglas C. Wolfe: "Ed, I'm sure we'd like to get your thinking on our subject."

Ed Lyons (Zahns Airport): "During this discussion I heard both Broome County and Allentown Airport referred to as 'a small airport.' I don't know exactly what to call

Zahns airport. Nevertheless, our management knows of the crash-rescue problems. At a privately-owned airport, every cent we earn is put back into facilities like runways, buildings, and more land. It becomes difficult to allocate money, a lot of money, on equipment which for the past 10 years we've had no occasion to use. We know there's a danger and that some day we might get hit. But it's hard to put this equipment on a preferential list."

"We have good community facilities. The fire department of the village of Lindenhurst is exactly two miles away and is always available. We did have one fire on the airport, four years ago, not due to a crash. It was a small hangar fire. Our own fire trucks could not have gotten to it more

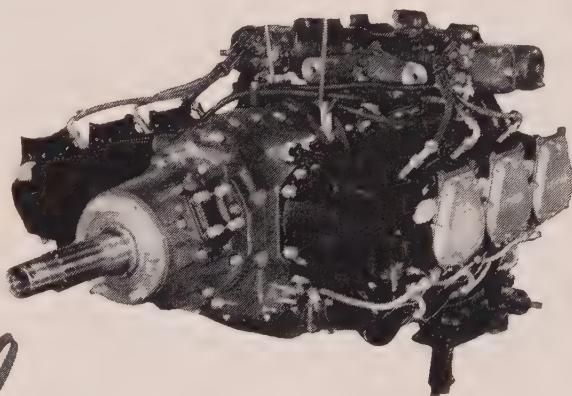
than a minute to a minute and a half sooner than the village trucks did."

Our own jeeps, trucks and gasoline trucks are equipped with fire-fighting equipment. And we have, now and then, lectures for our ground personnel on proper fire equipment use. Since we have our community's fire-fighting truck and rescue truck available, we don't see any practical reason for having to duplicate it."

Douglas C. Wolfe: "Thank you, Ed. Captain Olsen, would you like to comment?"

Capt. Carl B. Olsen (United States Coast Guard): "There is no argument as to the desirability of having fire-fighting equipment and trained personnel to man it at each airport. At most of the airports from which the Coast Guard operates, the fire

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(Continued from page 6)

Walter Michel moved from factory manager of Scintilla division of Bendix Aviation Corp., to general manager of the corporation's Utica division. He succeeds **Donald M. McGrath**, who will assist his successor until his new assignment is announced.

Charles H. Hurkamp and **Randell C. Smith** have assumed respective duties as chief of advanced design and chief of technical engineering at the Fairchild Aircraft Division. Meanwhile, **J. F. "Skeets" Coleman**, test pilot who first flew a vertical-takeoff plane, has joined the customer relations staff of the Fairchild Engine and Airplane Corp.

Named to Lear, Inc.'s staff recently are **Vernon B. Benfer**, division general manager of aircraft engineering division, **Emil Olsen**, manager of quality control and inspection, and **Sam F. Arn**, division manager of sales and contracts.

Shepard Dudley, with Esso Export Corp. since 1948, has been elected a vice president of the corporation.

Homer J. Penwell is now service manager for the newly-created Aero Commander division at Dallas Aero Service.

Harry H. Wallace, formerly with Fairchild Engine and Airplane Corp., has been appointed sales engineering representative for the Garret Corp., Los Angeles, Calif.

James R. Durfee was recently sworn in as a member of the Civil Aeronautics Board. He went to the Board from the Public Service Commission of Wisconsin. He succeeds **Ross Rizley**, Board chairman since March 1955, who leaves to become U.S. District Judge for the western district of Oklahoma.

William F. Whitesides has been appointed as engineering manager of Flight Refueling, Inc., and **C. Harry Smith** is now chief engineer for the Baltimore, Md., company.

and crash equipment is handled by the field operating agency, either military or civilian. Two exceptions are Elizabeth City, N. C. and Port Angeles, Wash., where the fields are Coast Guard operated. At these places, fire and rescue equipment is manned by service personnel when aircraft having passengers aboard land or take off."

Douglas C. Wolfe: "Mr. Talbot, how about you as a business aircraft operator?"

Curtis G. Talbot (*General Electric Company*): "I would like to talk about experience we've had with volunteer fire departments. It relates to our flight test activities at Schenectady County Airport. About 10 years ago, we undertook to fly some large airplanes, B-24's, B-29's, and later some jet aircraft, in connection with development work we were doing for the Air Force. At this rather small county airport, we had the usual problem: no fire equipment and no trained crews. With Air Force help, we located and leased two fire trucks, a Class 155 and a Class 135 truck. The 155 truck is a 1,000-gallon truck with two power turrets besides side hose lines. The 135 truck is a somewhat smaller one which we adapted to foam.

"We obtained 16 volunteers from each of two shifts, giving us 32 fire-crew members. Training was accomplished under the direction of a highly-qualified fire chief from a nearby Air Force Base. We maintain proficiency by conducting several live-fire drills yearly. Occasionally a man will volunteer for fire duty and later, during practice, find out that he is not qualified for this activity. Consequently, we feel that all of our fire crew members can be relied upon under emergency conditions.

"Our procedures have been developed so that, before a test airplane is released for take-off, drivers of each truck are ready with engines running, and an alert signal has notified other crew members that a take-off or landing is imminent. They don't have to be on the trucks unless required by special circumstances, but they must be ready to move quickly, if the occasion demands. All trucks have two-way radio, and we have a system that assures the pilot that the fire crews are standing by before he starts his take-off or makes his landing.

"About a year ago, we purchased a jeep equipped with 300 pounds of dry chemical; it's an effective piece of equipment, equipped with two-way radio. The jeep follows the airplane from the ramp to take-off position, and it's standing by before landing with the airplane's crew chief in two-way radio contact with it.

"We have learned that speed and training are probably the most important factors in successful crash rescue."

Oscar Bakke: "Is the jeep used for any other purposes around the field?"

Curtis G. Talbot: "No, it is restricted entirely to fire fighting."

Oscar Bakke: "How, so far as general airport utility is concerned, does that jeep, mounting the Ansul unit, compare with your other two units?"

Curtis G. Talbot: "Very favorably. In fire drills we put a steel drum on a low part of the airport, pour on several hundred gallons of refuse oil and gasoline, and light it. The boys cut a path, go right in and pull out the drum."

Douglas C. Wolfe: "With the Ansul jeep?"

Curtis G. Talbot: "They do almost as well with that little jeep as they do with the larger trucks."

Oscar Bakke: "I wanted to make the point that, in my inexpert opinion, I don't think enough emphasis has been given to the tremendous utility of the small jeep unit."

Wilfred M. Post, Jr.: "I'll certainly second the comment on small equipment. The medium-sized airport town, even if it could afford a piece of equipment like the Port Authority operates, doesn't have the personnel to man it. It's too complicated. The answer for these airports is a number of small units rather than one big unit."

Douglas C. Wolff: "I disagree with a small jeep unit. We are dealing with volunteers and our first obligation is to them. The type of protection that we provide at Binghamton, foam, is the safest thing that can be used. Once the foam layer is laid on the ground, it isn't likely that the fire is going to back lash into the volunteers."

Wilfred M. Post, Jr.: "We have a jeep that has a foam unit on it."

Douglas C. Wolfe: "Now you're talking about adequacy. I put a water tank on the back of my snowplow. We carry five gallon cans on the back of the fire truck. But where do you stop? You could put a 300-gallon water tank on a pickup, but suppose you have a fire involving a DC-6 where all the tanks are ruptured? We haven't heard from Joe Chase as yet."

Joseph M. Chase (*Flight Safety Foundation*): "As Johnny Groves said, we have been talking about this problem for 10 years. It is only now that we are actually coming to grips with it, probably because, either consciously or unconsciously, we have avoided the economic aspect—who is going to foot the bill?"

"But this meeting has brought us to the realization and to the public acknowledgment that we have a moral obligation to face up to the facts. Having accepted this responsibility, each for his own segment of the industry, we are well on the way out of the difficulty."

"What must be done and who will pay for it have become problems of mechanics, which should be relatively easy to solve now that we accept our responsibility to face the facts. That is why I feel that the outlook for Airport Crash Rescue Protection is the brightest it has ever been and why I think that the industry is indebted to SKYWAYS for calling this meeting."

Brian Aherne (*AOPA Member*): "I think that there are two fundamental problems: who's going to do the job and who's going to pay for it? There was an interesting suggestion made about the volunteer fire department. Someone should explore it more thoroughly."

Hervey Law: "That is a point I wanted to discuss. I think it is a very interesting thought that Abby brought out about volunteers. The Port Authority has invited all the volunteer departments near our airport to participate in our training. LaGuardia isn't affected much, because it is within the city, but near New York International are several volunteer fire departments. The chief at Mitchell Field has also invited nearby volunteer fire departments to train."

"I agree that training is the most im-

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portant thing; without trained men, equipment quality doesn't matter. When we get these volunteers, we put them through the same training that our men get. We have a training period every month at every airport, and we burn from 200 to 300 gallons of gas at each drill. We have several fires that big at one training period. Now, the only difficulty you find with volunteers, is that these boys come out, you give them training, and then they say, 'Well, we don't have equipment to cope with that in our volunteer setup. We're mostly equipped for residential or structural fires.' And they do not have the special equipment for handling large gasoline fires.

"With all the flying over Long Island, there have been numerous incidents where planes have landed in communities rather than at the airports. It might be well for many of these volunteer departments to get foam equipment. I think it's a splendid idea that the volunteer group be located at the airport wherever the community is near the airport. Most volunteers in your community department are storekeepers, clerks, and so forth. Therefore, the fire equipment must be close to them so they can run out of their stores to man it.

"But returning to airline personnel; again it's a matter of training. What ever happens on an airport, the airline employees are going to go out to that incident. We feel that it would be more helpful if we could train those men. We have offered to pay for their bunker clothes, and for all the gasoline used in the fire-fighting training; we have agreed to cover them with our compensation, and so forth. If they had the training, they would be much better off. Any individual, no matter who he is, if he comes to a highway accident, will stop to try to pull somebody out of a burning automobile. Individuals at the airport are going to try to do what they can. But when they come out, with no training, they may get in the way and they may be injured for lack of proper training.

"Again, very briefly, I mention cut marks. I think, first, the exits on the exterior should be well marked. One reason your statistics show that nobody has been rescued by cutting into an airplane is that rescuers couldn't find the marks in the first place, because they were too small. I feel that there have been definite cases where a rescue could have been made had the emergency exits been properly marked. We had an accident at LaGuardia where the wing and engine and nacelle had all wrapped against the aircraft. No one could have gotten out of the emergency exits had there been a fire. I know that they have been training people to open emergency exits from inside, but they sometimes are knocked unconscious and are unable to do so. So, if we can't get the cut marks, it would be a great help to have emergency exits clearly marked on the outside.

"You say that through training, you can know where these emergency exits are. Whenever a new piece of equipment comes in our men go through it to learn where the emergency exits are. We have large charts showing where they are. But I don't care how much training you give, when you actually get an incident where the fire is severe, excitement blocks the memory

of where those emergency exits are. Also, you have different emergency exits on the Convair, the Constellation, the DC-6, the DC-7 and the Martin 404. None of them are in the same place. Even with the finest training, a man can't remember exactly where emergency exits are from the outside when he gets out there in the excitement."

John Groves: "It seems to me that we have to take some sort of steps. Maybe AOC and AAAE should request the representatives from AOPA, ALPA, FPA, NCAA and ATA to draft a program. Otherwise, I don't see how we're going to do it except a bit here, and a bit there, and you'll lose . . ."

Hervey Law: "I'll say this. ALPA has been doing that, and they've been trying to get something accomplished. As you've said, there's been a lot of talk for 10 years, and we're still talking. We still hope to be able to accomplish more in the matter of volunteers than has been done in the past. I know the AOC realizes the importance of cooperation. It is not the airport operator's responsibility to make this equipment available or to supply sufficient men. Everyone must cooperate. I would like to see the CAB, since it has the authority to legislate, assist and come up with an answer on how to have protection at all airports."

Vernon H. Brown: "I think United has quite a program for employee training for protection on the airports. They give them a certificate after they've completed the training. It would probably be worth your while to investigate United's approach on this."

Wilfred M. Post, Jr.: "I'm somewhat familiar with United's program. Last year they employed a fire marshal. They are setting up a program now. How far it's progressed, I don't know. It hasn't gotten out in the field too far. I think the ultimate aim is to have a program that will lend assistance at all the airports in which they operate."

Hervey Law: "To sum up, we feel it's important to train on a hot fire every month. We don't do it just twice a year; we do it every month, so that our people have the feeling of heat and won't back away from it when the emergency comes."

Douglas C. Wolfe: "Well, Gentlemen, thank you very much. Let's hope we don't have any accidents, but let's hope also that we'll be trained for them and have the equipment to handle them if and when they happen."



Aerial Roulette

(Continued from page 15)

are valuable, they are often too brief to appraise an applicant's flying ability under all conditions. Moreover, his motivations and behavior may not represent his later performance under unsupervised flight conditions.

Yet the executive transportation company gives the new-hire responsibilities far sooner than his airline contemporary and, in many respects, the business pilot occupies a more exacting job. He must be prepared to fly anywhere at any time, quite frequently over unfamiliar air routes and into new airports, and often with inadequate air navigation facilities. More often



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than not he is his own dispatcher, meteorologist, steward, navigator, and occasionally, his own mechanic.

A friend of mine is an executive company chief pilot in San Francisco. He was a bush pilot for many years and has more flying hours than John Foster Dulles. "It's just tough for me to believe," he says, "that a bunch of test scores are going to tell me which pilots are the ones to hire. How can you be sure that high aptitude men will actually make better pilots than those who are not right up to snuff?"

In a way, he might be right, for the *Stanine* system is not a perfect system and it is possible, though not probable, for a low *Stanine* to "cut the mustard." It more or less works the same way an insurance actuary does. He can't tell you exactly what your life expectancy will be, but he can predict that the average person like you will live, say, 30 years more. Similarly, the *Stanine* tests can predict that the percentage of '9's' who will be successful pilots is a lot greater than the percentage of '1's' who will be successful.

There can be no argument with the record of the *Stanine* in multi or the 5,000 airlines pilots. For \$50, the cost of the *Stanine* (\$35 for a group of eight or more), an executive company can be more certain of their pilots. They can find out if a pilot is likely to be with them for a long time or is an aerial transient (for results to date have indicated that high *Stanine*'s tend to stay the longest with one company.)

C. M. Urbach, United Air Lines, said, "it costs United Air Lines about \$6,000 to train a pilot-flight engineer and about \$7,000 when he comes to us without an instrument rating. Of course, the cost is undoubtedly less for many airlines than it is for United, which has an unusually thorough training program. On the other hand, training cost is a very small item when it is compared to the cost of an accident!"

"I am positive that the test battery would do a good job in selecting executive pilot applicants."

Fifty dollars is little enough for a stamp of approval on the pilot who will tote the company brass along the air routes and, in some respects, safety has a deeper and more personal meaning to the executive companies than for the airlines.

Dr. John Flanagan, Director of AIR, said, "The critical requirements for flying twin-engined or single-engined planes are similar enough to the requirements for multi-engined equipment that our present battery has been found to be useful for selecting executive pilots."

A few executive companies have tried the *Stanine* tests. Buell Whitehill, Director of Personnel for Rust Engineering, said, "In the case of pilots we selected, I can say that they are persons who are curious, inquisitive, and anxious to learn. We found that the battery did an excellent job of selecting after we had done the preliminary screening. And the by-products of administering the test was more insight into the pilots' attitude."

Robert C. Sprague, Jr., of Sprague Electric Company of North Adams, Mass., said, "The test did indicate that it is an excellent guide that can be used as a tool, though not as a substitute for interviewing."

The last decade has demonstrated that

the application of scientific methods to problems of human resources and their utilization can be of great practical value. World War II and the major airlines of the United States agree and the executive flying industry need only reach for the plum if they want to eliminate aerial roulette with the bossman.

Lateral-Diversion

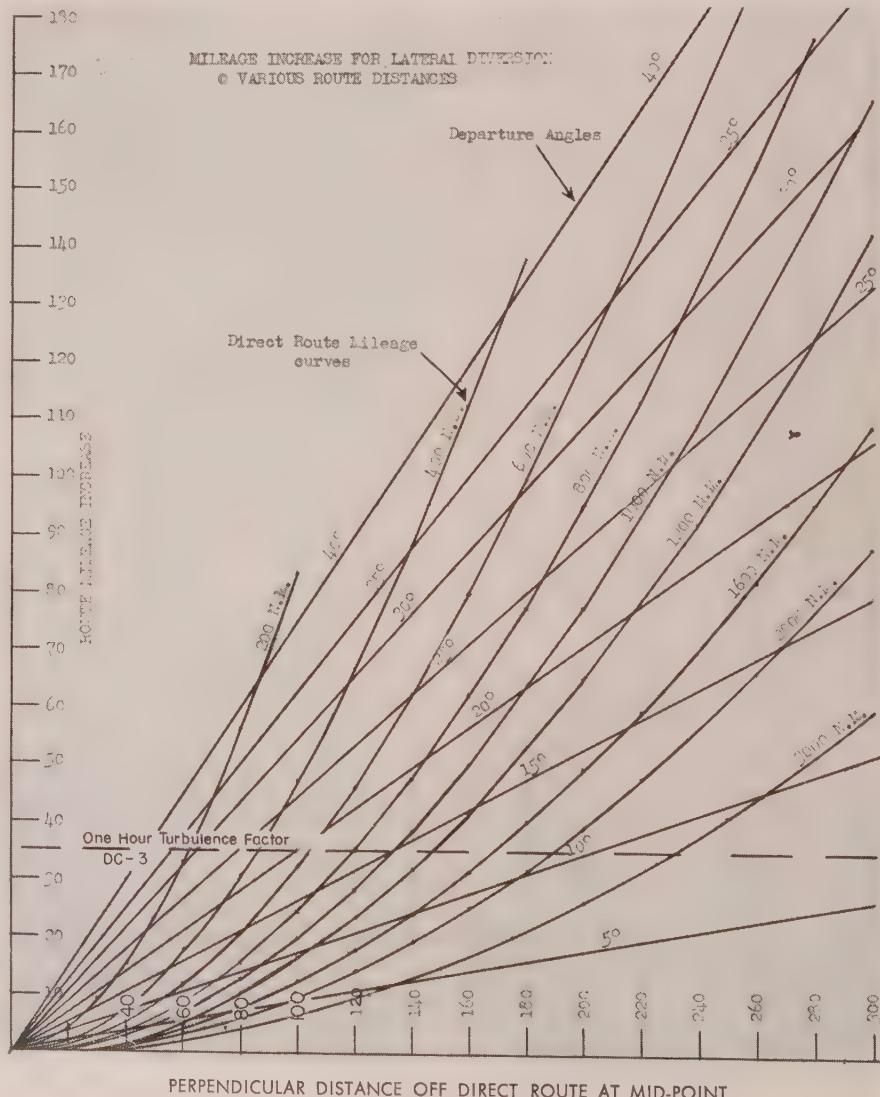
(Continued from page 12)

the efficiency of an aircraft cruising at 450 knots, with a 100 knot lightplane, both operating over a pressure track of 1,000 N.M. with a wind component of 50, as compared to their respective flight times on a direct track of 800 N.M. with a -50 wind component. The faster aircraft will require two hours to traverse either track. The slower aircraft will require 6:40 on the pressure-pattern track, or 41½% of the 16 hours required on the direct track. Wind is increasingly more important with reduction in airspeed and represents a greater percentage of the groundspeed and flight time. As compared to high speed aircraft, a slower aircraft can divert to a greater lateral distance to secure a favorable wind, will realize a larger percentage of flight time reduction over the same minimum-time track, or can operate over a shorter route distance for

the same percentage of flight time reduction. Executive aircraft are inherently suited to pressure-pattern flight because:

The fact that application of these principles will increase comfort, and substantially reduce flight time is already well proven. Airline dispatchers have been planning successful diversions to secure these benefits for a number of years. A systematic solution for a minimum-time track has been in daily use by two domestic air carriers, for all flights of 800 N.M. or more, for over two years. Executive aircraft may operate successfully over distances somewhat less than this. The probable minimum practical distance of 700 N.M. is dictated by the limitations of forecast wind fields in relation to the larger departure angles required to achieve a substantial diversion over shorter route distances. The author has employed this system successfully on numerous occasions. In particular, flight time reductions of over two hours are recalled between Dallas and New York, by flight over minimum-time tracks through Alabama, Georgia, and overhead Norfolk. The usefulness of this technique is dependent on the nature of the operation. Short-range operations may experience little or no advantages; others may benefit considerably. Representative routes STL-NY, RML-MIA, CHI-HOU, and

(Continued on page 43)



follow the swallow

FLY LIGHT



ARC's new ADF weighs less than 20 lbs!



TYPE 21 ADF WEIGHS ONLY 19.7 POUNDS

Component Units Weights: Receiver, 6.8 lbs.; Loop, 4.3 lbs.; Loop Housing, 0.5 lbs.; Control Unit, 1.6 lbs.; Indicator, 1.3 lbs.; Power Unit, 5.2 lbs.
CAA Type Certificated

Birds have nature's navigation instruments and can return unerringly to their nests from a continent away. They follow special flyways as you follow a chosen course.

But you can out-navigate the birds with ARC's miniaturized ADF. Here, after two years of testing, is an Automatic Direction Finder of great reliability—in a system whose combined parts weigh less than 20 pounds. It requires less power, too—only 2.8 amps at 27.5 volts. It has hermetic sealing of vital parts, including the entire loop, and other mechanical design features to insure ARC-dependability under today's exacting requirements. Now a dual installation, where required, will save 80 or more pounds and make room for other much-needed equipment or more payload.

The ADF is still the Number One worldwide navigational aid, usable on an estimated 60,000 radio stations. ARC's Type 21 is tunable to all frequencies from 190 kc to 1750 kc.

An outstanding feature is extremely low drag of the loop housing, which extends only two inches into the airstream.

Here is reliability you can trust—in a small package... high performance to ARC standards, trusted for 28 years. Ask your dealer for descriptive literature.

Omni/ILS Receivers • Course Directors • UHF and VHF Receivers and Transmitters
LF Receivers and Loop Direction Finders • 10-Channel Isolation Amplifiers • 8-Watt
Audio Amplifiers • Interphone Amplifiers • Omnidirectional Signal Generators and Standard
Course Checkers • 900-2100 Mc Signal Generators

Dependable Airborne Electronic Equipment Since 1928



Aircraft Radio Corporation BOONTON, NEW JERSEY

NU-AVI-QUIP

Devoted to Equipment and Service Needs of Executive and Utility Aircraft

THE SQUAWK SHEET

Attention—Agricultural spray operators!

If you have been spraying Magnesium Chlorate, both your aircraft and surrounding hangar and ramp area may be a continuing fire hazard!

An aerial operator contracted to defoliate 60 acres of cotton with a solution of Mag. Chlor. flew his morning flight, returned to line and parked his aircraft. While at lunch, he looked out just in time to see the ship burst into flames! Temperature was 105° in the sun. Investigation revealed that, although Mag. Chlorate spray is part Mag. Chloride (fire inhibitor) and Sodium Chlorate (fire hazard), when the solution dries out, as in case of residue on tank walls, fuselage, etc., separate crystals are formed and any concentration of heat nearby, as in heated hangar, sun's rays through window or windshield can set it off. Similarly, a dried spill of the stuff on an airport apron will explode into flame if scuffed as with a shoe!

Remedy — thorough after-washing with plenty of water, and contact supplier for antidote solvents.

New NARDA System Simplifies Airborne Radar Ground Maintenance

In less than a minute, an accurate test of overall performance of airborne weather radar can be made by means of a new Pre-Flight Test Set developed by The Narda Corp., Mineola, New York.

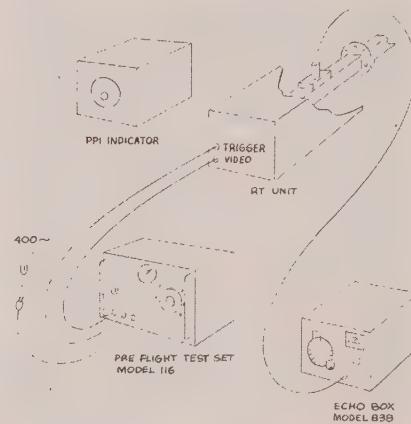
Complete and accurate measure of performance without painstaking measurements of receiver sensitivity and transmitter power usually requiring at least a half-hour, is now possible. It enables competent pre-flight line radar checking by relatively inexperienced communications maintenance personnel at any commercial aircraft radio service station.

Small, light, and rugged even under the most adverse conditions, the Narda Test Set operates from the 400-cycle power available in the aircraft.

The Test Set is used in conjunction with the Narda 833 Echo Box. The Echo Box provides an artificial target to the radar; the Pre-Flight Test Set, which is connected to the radar video output, measures accurately the response of the radar to the target. A radar performance is read directly from the front panel of the Test Set. A variation in performance of even 1 or 2 db can be measured.

Although designed primarily for testing C-Band Weather Radars, the Pre-Flight Test Set may readily be adapted with very slight modification to pre-flight or line

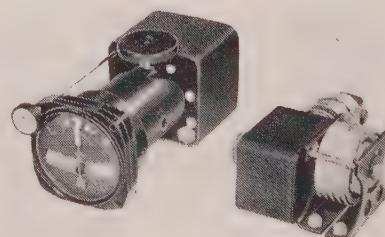
check any radar in conjunction with any good echo box tuned to the appropriate radar frequency.



Low-Cost Single-Axis Autopilot Features Design Simplicity

Aircraft owners interested in a maximum of safety and convenience but unable to cope with the cost or weight of complete auto-pilot systems will be interested in the DART I which controls heading smoothly and continuously, reducing pilot workload thereby providing more time for navigation and communication duties. Called the DART I by Air Associates of Teterboro, N. J., it consists of only two components—a turn-sensing unit and an actuator—connected by a single cable.

Utilizing the reliable, sensitive gyroscope of a standard turn and bank indicator to sense and control turn rate, the blending of control functions with standard aircraft equipment accounts for the low weight of 3 lbs and cost of \$495.



Self-Propelled Runway Sweeper Announced

A self-propelled road and runway sweeper manufactured by Little Giant Products Co., Peoria, Ill., is a combination of a prime mover and rotary-brush assembly, each with its individual engine.

The separate engines make the Little Giant SP-C easily adaptable to a great many applications. The prime mover has a heavy duty, 48-hp industrial engine, water cooled and electrically started. The brush is powered by a 7 hp air-cooled engine.

Dirt, trash, rock, snow and other materials are quickly cleaned from any relatively even surface. For heavy sweeping, the brush can be rotated faster and the prime mover driven slowly. For light sweeping, the brush can be rotated slowly and the prime mover shifted to a faster speed. For large areas, this flexibility is extremely important.

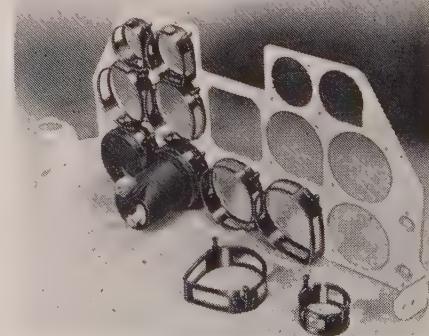
The brush can be removed with one bolt and the prime mover can then be used for other utility jobs around the plant, airport, etc. Of particular interest to airports is the fact that the sweeper provides a method of sweeping snow from airport runway lights instead of doing the job by hand. The soft bristles make it possible to handle snow any place where snow plows might injure curbs, pipes, lights, etc. The brush can be tilted up or down on either end, and angles right or left. Full floating, the brush is adjustable for ground pressure.

The machine stands 4' 3" high and, complete, is 11' 6" long. Brushes may be obtained in three cross lengths—6, 7 and 8 ft. The brushes are of tough, durable palmyra fibre and can be rebristled, as can all brushes made by Little Giant.



New Lightweight Instrument Clamps

Designed for quick, easy installation and removal of instruments from the front of the panel, the non-magnetic, AN approved clamps of the Marman Products Co., Los Angeles, Calif., are available in 1½", 2" and 3¼" sizes for immediate delivery. Featuring a 60% saving in weight over stand-



ard instrument clamps. They fit 1/16" to 1/4" instrument panels without adjustment. Special sizes and shapes are available.

Lateral-Diversion

(Continued from page 40)

DCA-DAL are typical routes offering opportunity for advantageous use.

One of the main advantages of executive aircraft ownership is the high "door-to-door" speeds as compared to any other combination of transportation mediums. Only against strong headwinds for extended periods of time, does a lesser air-speed appreciably increase door-to-door transportation time. A minimum-time track works best under these conditions; a strong wind field being a prerequisite to successful operation. Inasmuch as strong winds at the lower altitudes are also frequently associated with a curved windstream (the remaining prerequisite), the odds for employment of this technique under those conditions is quite good. In some instances, it will serve to eliminate a fuel stop, thus further reducing the over-all time enroute. The selective use of a minimum-time track can minimize the disadvantages of operation against a strong headwind, and thereby increase the economic radius of action. Related articles on "Windstream analysis for pressure-pattern flight," and "Minimum-time track construction," will follow in consecutive issues.



The Gull is Royal

(Continued from page 17)

the sea-rudder retraction cable between them. This sea-rudder cable hangs down in the cockpit when the rudder is in use so there is no chance of leaving it extended accidentally.

The throttle quadrant has only throttle and prop controls; there is no mixture control. Pressure-diaphragm carburetors automatically compensate mixture control at altitude. Directly in front of the control panel are the idle cutoff push-pull knobs marked "stop." Below are optional fire extinguisher controls to pipe CO₂ gas to either engine. Plumbing for this extinguisher system is installed as standard equipment and the extinguishers may be added if desired.

When you first taxi the *Gull*, you become impressed with its 6,000 lbs allowable gross weight. The tail wheel, even when unlocked for taxi, sits heavily on the ground and you have the immediate feeling that this airplane will remain rolling in a straight line after landing regardless of crosswind because of the long fuselage with its three wheels mounted well apart.

Normal take off calls for half flaps and a 965-foot roll. With a slight assist from a 10-knot wind rolling down Runway 25R, we lifted into the air in about 800 feet. METO power for N221A is 3,400 rpm at full throttle. Climb-out power setting was 24 inches and 2,910 rpm and we reached 9,000 feet in 19 minutes.

There was no auto-pilot in 211A and I can see no real reason for installing one. The *Gull* is perfectly stable with absolutely no tendency to yaw or hunt.

Since it was a beautiful sunset over the desert near Daggatt, we cut back to economy cruise, 21" and 2,700 rpm at 9,000 feet and watched the full moon rise. Our indicated air speed was 139 mph which trued out at 163. Just before sun-

set, Werstlein pulled an engine to demonstrate the single-engined characteristics of the *Gull*. There was surprisingly little yaw; not the vicious swinging of the nose found in some twin-engined aircraft, even at cruising speed. We set climbing power on the "good" engine, trimmed out the rudder and, since we were under gross weight by possibly 800 pounds, were almost able to maintain altitude of 9,000 feet.

Actually, the only unexpected occurrence on the whole two-day flight happened just after dark when I moved a pilot's "brain bag" (brief case) that was sitting between the seats. The brief case hit the gear-down handle and extended the landing gear at cruising speed. There was only the slightest down pitching tendency and our air speed dropped by about 12 mph. Werstlein grinned, pointed out the offending handle with a flashlight and pulled the gear up again.

Standard equipment on the instrument panel of the *Gull* includes a gyro compass and horizon with a complete blind-flight group, a Lear LTRA-6 combination, and a complete dual-engine instrumentation. Since the potential uses of this aircraft are so varied, any of six optional radio installations packages are offered as factory installations.

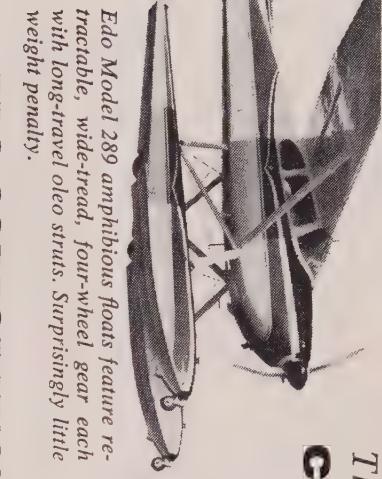
We approached the brilliantly lighted Las Vegas strip so quickly in the clear desert air that it required a 360 on a long final to get down to pattern altitude. Cabin lighting is excellent and with the 22 Grimes "eyebrow" lights on the instrument panel, there is no problem in reading all the needles on the gages. The two landing lights mounted flush in the leading edge outboard of the engine nacelles give excellent runway lighting without any cockpit glare.

The Las Vegas tower cleared us straight in on Runway 1 and at the same time cleared a TWA plane in on the intersecting runway from the south. Had the airliner made a go-around, we would have arrived at the same air space at the same time; so our approach was on the high-and-fast side. However, the scheduled airliner rolled to a stop and we touched down part way down the runway.

Landing the *Gull* is a pleasure. As in most other aircraft with a fairly high wing loading (the *Gull* is 22.22 lb. per sq. ft.), a power-on approach is standard. The flaps come down immediately, and I mean right now, when the flap handle on the control quadrant is moved down. With gear and full 60° flaps, a comfortable approach speed in calm air is about 90 mph. As you near the ground and come back on the power, the big *Gull* decelerates rapidly and you find yourself on the ground with the tail wheel down solidly much sooner than you expect.

Despite the engines being mounted high, there is absolutely no tendency for the *Gull* to swing away from its straight-ahead roll-out. Brake action is smooth and effective.

Dimming one landing light at a time, we taxied up to George Crockett's tie-down line and shut off the engines with the idle cut-off knobs on the instrument panel. It had been a pleasant, comfortable trip.



Edo Model 289 amphibious floats feature retractable, wide-tread, four-wheel gear each with long-travel oleo struts. Surprisingly little weight penalty.

Edo Model 289 amphibious floats feature retractable, wide-tread, four-wheel gear each with long-travel oleo struts. Surprisingly little weight penalty.

Your Cessna 180 on Edo amphibious floats gives you great new utility you never dreamed possible before. Suddenly, you have a million landing places—every lake, harbor, river, plus regular airports.

And you get such wonderful performance with the Edo 180...over 135 mph cruise, fast take-off from water, the nicest handling character-

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Standard Edo floats available for all single engine planes, Cessnas and many other types.

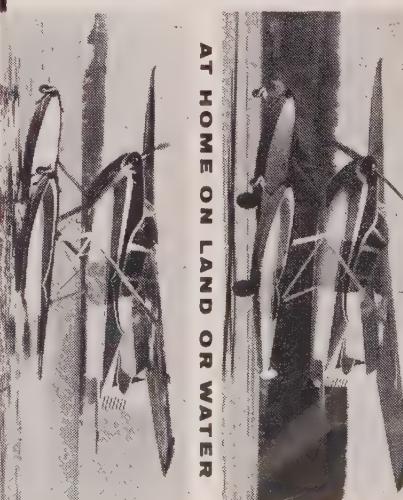
Fine Floats since 1925

The Perfect Amphibian...

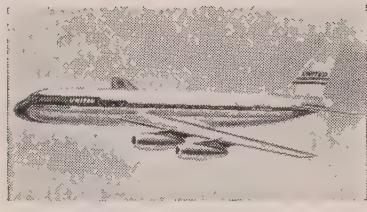
CESSNA 180 ON



FLOATS



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Your career at excellent pay in a growing industry is assured as a Flight Officer with United Air Lines!

United is taking delivery this year and next on 45 new four-engine airplanes—followed by the first of 30 DC-8 Jets in 1959. United's steady expansion means future advancement. You're paid while training at United's extensive Flight Training Center at Denver, Colo. You receive \$485 a month as soon as you go on line duty. And United offers a broad insurance program, retirement income plan, other benefits.

To qualify you must have a commercial pilot's license with 165 hours or more (no multi-engine time required); be a U. S. citizen, 21-30, between 5'7" and 6'4" in height, a high school graduate, and able to pass a flight physical without waivers. Applicants with C.A.A. instrument rating and superior flight qualifications will be accepted through age 32.

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The next morning dawned clear and bright but that's not unusual for Las Vegas. After a leisurely breakfast, we drove out to the airport and planned our flight for the day. We had originally planned to shoot some water landings behind Boulder Dam but several local pilots advised us that there were restrictions against this particular activity. When we were unable to find anyone (it was Sunday) to give us an official okay, we took off, circled low over the lake a couple of times and headed westward toward California.

We filed VFR to Thermal, just south of the Salton Sea, 241 feet below sea level. Aided by unusual winds, we zig-zagged around the Twenty Nine Palms rocket and artillery range, and still clocked 200 mph ground speed on this leg of our flight.

Our let down to the north end of the Salton Sea was smooth and fast. Mr. Werstlein explained to me the finer points of landing the *Gull* on water. A former PBY pilot, Werstlein pointed out that most flying boats had to be landed in a nose high altitude and then held nose up as long as possible while slowing down on the water. "If you'd ever flown another 'boat,' this would scare you to death," he said as we circled over the Salton Sea to check the wind and for floating debris.

We turned into the wind, dropped the flaps and settled on a shallow rate of descent. We skimmed along above the water and came back slightly on the power. There was a swish, sort of a rapid spanking sound and we were on.

"Just ease slightly forward on the wheel," explained Werstlein, and the nose came down a trifle and we planed out over the small waves with nary a drop of spray on the windshield until we were almost stopped. The *Gull* drifted to a stop and then one tip float dropped slowly into the water. Even for a landlubber, it seemed a simple "no sweat" operation. We cut both engines and I climbed out on the bow through the right hand window that opens forward to take some pictures. This folding window is installed for easy access to the anchor and line storage locker and provides a safe standing position for beaching, mooring or docking. The folding right window is an inch or so higher; thicker at the frame than the left window, and this difference in height tends to give a "green" pilot a bit of trouble in changing from left to right seats, but any amount of time in the aircraft would eliminate this problem.

A number of speedboats soon congregated around the big white amphibian and I hitched a ride aboard one of them to get far enough away from the *Gull* for a few photographs. Then back aboard and set for take off. The engines started easily and we taxied in lazy circles waiting for them to warm up. Just to see the amount of drag, we dropped the landing gear in the water and found it must easier to make a pre-take-off run-up without covering the whole Salton Sea. These procedures may be old-hat to water pilots, but they were a new experience to me.

Take off from the below-sea-level Salton Sea was rapid and efficient. At the start of the roll (or what do you call it on water?), full-up aileron is applied to pick

the tip float out of the water. As soon as the tip float comes unstuck, back comes the wheel to put the *Gull* up on its step. Then you merely skim along the top of the water until flying speed is reached, ease back on the control column and you have it made. Then there's all that wonderful open space ahead never found adjoining airports, should you want to come down again. Our take-off time was under the 18 seconds specified by the company.

We flew back from the Salton Sea late in the afternoon over miles of jammed-up automobiles returning from Sunday outings. Even the normally-turbulent Banning Pass was smooth as we headed into the smog-bound sunset. It was another night landing with rather restricted visibility but the broad windshields of the *Gull* made the approach and touchdown seem easy.

As we taxied in and shut off the engines, Werstlein mentioned that he would leave a note to have the plane washed with fresh water in the morning. Normal operation from salt water makes this procedure advisable.

The utility potential of an amphibian of this style is endless. Any body of water makes an airport and any airport does as well. For the businessman with commitments in isolated areas where surface transport is poor and good airports not available, the *Gull* would be ideal. For exploration projects requiring low flight over water or jungle, the twin-engined safety potential of the *Gull* is what a pilot would order, plus the advantage of operating out of seaport towns many miles from the nearest large airport. Four *Royal Gulls*, for instance, were sold in Canada in the single month of February, 1956.

The big white airplane loomed high over the wings of the other parked executive craft in Leo Yoder's tie-down area as we unloaded our baggage and drove away. It's a fine Italian-American airplane, one that is sure to find a home with many stateside enterprises.



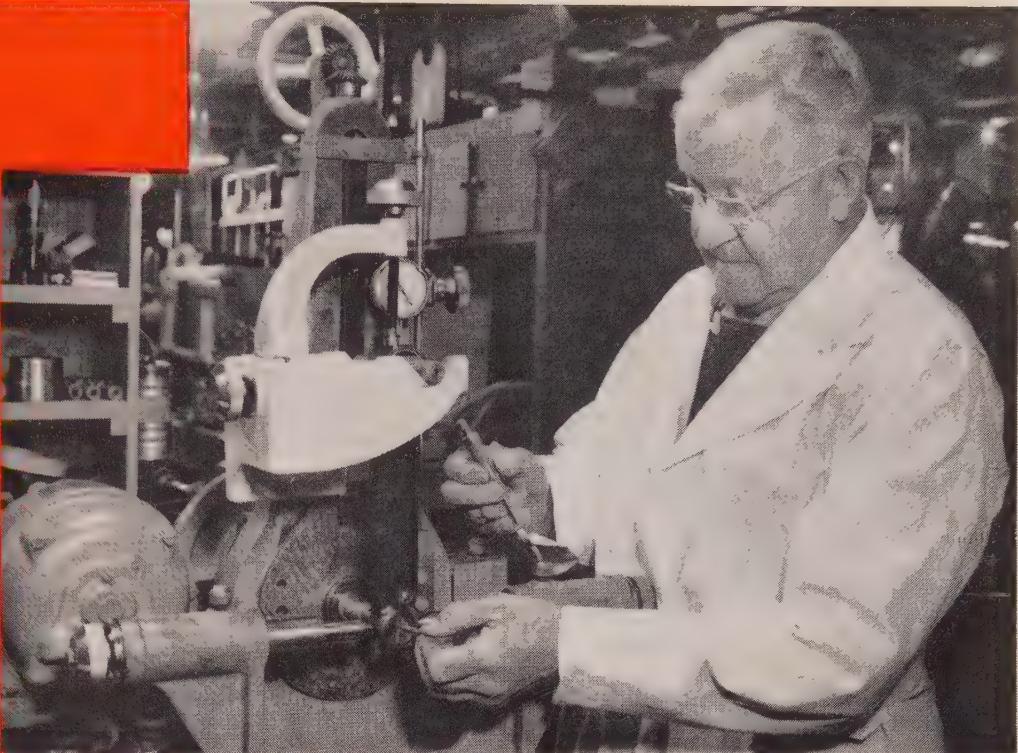
Navicom

(Continued from page 28)

directional results have been obtained from HARRISBURG LFR Range (Class 150 watts) from over Boonton almost 100 miles away.

A Compass Test Switch is provided, mainly a safety device enabling the pilot to make certain that (1) his ANTCOMP switch is on Comp when placed there, (2) the system is operating on a signal strong enough to bring the loop back to the same position, whether displaced clockwise or counter-clockwise, and (3) the station desired is properly tuned for ADF purpose as well as checking with the tuning meter. Switching the Comp Test Switch to either side, "slews" the needle off the indicated directional position (making it unnecessary to rotate the tuning control for this purpose). If the ADF needle does not return essentially to the same position after releasing the Comp Test Switch, there may be trouble with the apparatus, or the signal may not be strong enough or properly tuned.

Low frequency ADF is especially suitable in low-altitude flying where "line-of-sight" VHF reception is restricted.



TOOLS, TECHNICIANS AND TIME-TESTED RELIABILITY

The combination of tools, technicians and time-tested reliability are the factors that make a Dallas Airmotive overhauled engine the most RELIABLE to be found. More than 8,000 engines overhauled at Dallas Airmotive attest to this.

The tools and equipment used at Dallas Airmotive are the best to be found. Not only are these tools the finest in quality but are in a quantity not to be found outside the manufacturer's plant.

Dallas Airmotive's technicians are outstanding specialists in the field of airplane engine overhaul.

Years of experience and the record of 8,000 engine overhauls results in Time-Tested Reliability.



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NBAA

(Continued from page 31)

doubled. Without a single exception, every year since 1947 has seen an increase in business transportation flying.

Year by year since 1947, accidents in general aviation business flying activities have followed a downward curve, and there has been favorable improvement in the accident rates. The fatal accident rate per 10,000 hours flown dropped from 0.24 in 1947 to 0.10 in 1954. The non-fatal accident rate per 10,000 hours flown declined from 2.63 in 1947 to 0.84 in 1954. Accident data for 1955 are not yet available.

The following tabulation summarizes business flying hours and accident rates for the period 1947-1955:

The figures below were compiled from the CAA annual survey of aircraft use; accident data from CAB Bureau of Safety Investigation and CAA Office of Aviation Safety.

Calendar Year	Hours (Thousands)	Per 10,000 Hours			
		Fatal Accidents	Non-Fatal Accidents	Fatal	Non-Fatal
1947	1,966	48	517	0.24	2.63
1948	2,576	86	749	0.33	2.91
1949	2,615	57	673	0.22	2.57
1950	2,750	56	452	0.20	1.64
1951	2,950	34	387	0.12	1.31
1952	3,124	40	402	0.13	1.29
1953	3,626	48	365	0.13	1.01
1954	3,875	39	326	0.10	0.84
1955	4,300	N.A.	N.A.	N.A.	N.A.

NBAA Pressing Single-Strip Small-City Airport Program

In the last few years there has been a growing recognition that, in most cases, airport plans have had no specific relationship to over-all city plans. This situation has developed as a result of technical changes in airport requirements and type of use, and as a result of changes in the aircraft itself. It has, in addition, been compounded by the rapid urban growth of our major metropolitan centers.

Sound airport planning has come to recognize the importance of airport development to community growth, compatibility of adjoining land use, protection of property values, and the many economic factors which both affect the airport's location and surrounding land use.

It has been found necessary, to safeguard airport investments, to develop operational requirements, land use programs, and highway patterns as a direct element of airport planning. Airport planning can no longer be restricted to the boundaries of the airport.

With the booming growth of business, airline, and military aviation, many communities are finding a definite need for more than one airport to relieve congestion at their major facility. Smaller communities are experiencing a demand for landing strips if their area is to be attractive to industry.

In both of these cases, flight strips are proving to be a sound solution. Total costs of an auxiliary airport or flight strip are proving much less than the expense of expanding a major airport to provide an equivalent increase in traffic capacity. Even

smaller communities find them within reasonable budgetary limits.

NBAA is pressing its program for adequate single runways in the smaller industrial communities as a means of stimulating wider use of business aircraft by firms not fully acquainted with the advantages of owning and operating their own air transportation.

NBAA Survey Reveals Members' Airport Needs

A recent survey conducted by NBAA reveals facts about the requirements of business flying that will materially affect airport terminal planning.

About five people (on an average) arrive in each business airplane that lands at any airport today. With passenger loads ranging from two to nine, NBAA's survey shows the average load to be exactly 4.7 people. Business fliers strongly favor having apron space reserved for them close to each airport terminal building.

Here are some of the NBAA questions answered by the users of aircraft in commerce and industry:

Question 1. During 1955, what was the average number of people *per flight* (crew included) that were transported in the aircraft used by your company? **Answer**—An average of 4.7 people.

Question 2. Do you propose that business and private aircraft have free use of public-financed airports just as business and private automobiles and light trucks have the use of public-financed roads without a use fee? **Answer**—84% Yes, 16% No.

Question 3. Should some portion of the apron area contiguous to each airport terminal building be reserved for the parking of business and other non-scheduled aircraft? How much? **Answer**—The affirmative was practically unanimous. Estimates of the apron space to be reserved ranged from 10% to 40%. The replies produced an average figure of 21%.

Question 4. Do you favor a special radio frequency for general non-safety use and/or air-to-ground telephone service? **Answer**—Special radio frequency—89% Yes, 11% No. Air-to-ground telephone—63% Yes, 37% No. (NBAA "Airport Letter.")

Bad Landings Blamed on Lethargic Eye Muscles

If you have experienced a hard, rough landing at the end of a long business or airline aircraft flight, have a little sympathy for the pilot. After relatively long periods of flying at high altitudes, one's eyes have an indisposition to accurate distance and depth perception. There being nothing outside the cockpit for the pilot's eyes to focus on, his focal distance becomes established at a mere 3½ feet. Therefore, at the end of a trip, when the pilot comes in for his landing, this induced muscular lethargy of the eyes produces inaccurate distance and depth perception. The result: a landing you can't brag about.

One solution to the problem appears to be the exercising of the eyes during the let-down beginning at an altitude of about 1,000 feet. Looking back and forth from the instruments inside the cockpit to objects on the ground permits your eyes to have "limbered up" to the point where

instant and accurate depth and distance perception are available. (USAIG Bulletin.)

First 1956 Quarter Sets Business-Plane Sales Record

The business aircraft industry scored a record first quarter for the 1956 calendar year with a total of 1,658 units being delivered by the four major manufacturers of business utility airplanes, based on official figures for January and February and unofficial month-end reports for March. This marked a 54% increase in units over the 1955 first quarter for the industry.

Business airplane deliveries for the first quarter amounted to \$30,959,372 in estimated retail dollar value, which was a 48% increase in dollars over the 1,077 units that were delivered during the first quarter of 1955 with an estimated retail dollar value of \$20,890,665.

The big increase in business airplane sales by all utility airplane manufacturers indicate that the businessman is beginning to regard the airplane as a necessity for business transportation and more businessmen are now able to travel increased distances and spend more time with their families and clients than ever before. "Their sales records prove they spend more time *doing business* and less time enroute," one aircraft manufacturing official said.

NBAA Helps Brief the President's Aviation Aide

A special panel of VFR operations was conducted in April for Edward P. Curtis, Presidential aviation aide, holding his first group meeting since he took office. The panel was organized by Carl Christensen, safety director of NBAA Associate member United Airlines and chairman of ATA's VFR committee. Participating in the prepared discussion were representatives of NBAA, ATA, NATA, AOPA, Army, Navy, and Air Force SAC and ADC. The informal meeting provided background information to Curtis on the problems of mixing VFR-IFR traffic; mid-air collisions; air traffic control involving jet, piston, turboprop aircraft and helicopters; high density terminal area operations, and high altitude flying.

Business Aircraft Forum At Teterboro June 13

A B. F. Goodrich technical forum for business aircraft pilots and maintenance men will be held Wednesday, June 13, at Teterboro Airport, Teterboro, N. J. The forum is jointly sponsored by Atlantic Aviation Corp., and the Newark branch office of Airwork Corp. It will meet in the Atlantic Aviation Corp. hangar, beginning at 1:30 p.m.

The forum will consist of a series of lectures by Goodrich experts on such subjects as the installation and care of de-icer equipment; hints on the maintenance of aircraft wheels and brakes; and tubeless tire installation. The lectures will be followed by a general discussion period, with the Goodrich team answering any and all pilots' questions from the floor.

.... in the business hangar

(Continued from page 24)

- Pesco Products pilot Mervyn Wenzel brought his company's Aero Commander in to Southwest Airmotive last month for major repairs.

Johnny Dawson, Childs Grocery Co. pilot, had the Twin Beech in for major work including a 1,000-hr inspection, paint job and new interior. Mrs. Childs was a SAC visitor while fabrics for the new interior were being selected.

La Consolidad's pilot, Luis Salinas flew the company's C-82 Packet to SAC for repairs. Pilot Bob Lyle, had his Beech B-50 in for repairs, too. Dresser Industries' PV-1 was steered in for a 100-hr inspection by chief pilot Larry Montigny, and Shamrock Oil and Gas' chief pilot, Jimmy Boyd, had the *Lodestar* in for SAC repair.

- Lear Aircraft Engineering Division has converted Plymouth Oil Co.'s *Lodestar* into the first *Learstar* Mark II. Reportedly, flight-test performance exceeds expectations. Demonstrations for CAA Transport category certification were scheduled to be completed before July.

- Al Scarlata brought the Tide Water Associated Oil Co.'s *Lodestar* to Spartan Aviation Service, Tulsa, Okla., for re-wiring, 100-hr inspection and other work recently.

Spartan installed new interior and picture window, recovered control surfaces, repainted, and did a 100-hr inspection on A. M. Scaife's DC-3. Chief pilot of the plane is J. E. Leonard, and Ralph Rathgeber is co-pilot.

R. C. Pomeroy, pilot for Sohio Petroleum Co. had Spartan do a double-engine change and a 100-hr inspection on the company's Beechcraft D-18.

Dick Smith, chief pilot, Champion Paper & Fibre Co., had Spartan make a left engine change, and installation of Spartan-developed hydraulic rudder assist and electric elevator trim-tab system during a recent visit to Tulsa.

- Wyatt C. Hedrick, world-famed architect, had his *Lodestar*'s interior completely restyled by Horton & Horton recently. Luxury touch in the grey-blue-turquoise interior is sculptured head of Nephrite's daughter (Egypt circa 1400 B.C.) mounted on a frosted walnut console.

- Van's Air Service, Inc., newly moved from St. Cloud, Minn., to Winona, Minn., into new facilities has recently done radio work on the Aero Commander of the Marathon Corp., Oshkosh, Wisc.; 100-hr inspection and engine change on DeKalb (Ill.) Agricultural Assn.'s Aero Commander; and 100-hr inspection and top overhaul on the Commander of Tidy House Products, Shenandoah, Ia. Work on 100-hr inspections for both the Ray-O-Vac Co., Madison, Wisc., and General Mills Commanders was scheduled for early May, while autopilot installation, and other work was done on several *Navions* and *Bonanzas* in the new Van facilities.

- John Nark, chief inspector, Mohawk Airlines, Inc., has been visiting Dallas Airmotive, Inc., relative to time-extension inspection on his P&W R-2800 engines overhauled in DAI shops.

Jim McCoy, Union Producing Co. pilot, visited DAI in May to have his *Mallard*'s P&W R-1340 engines overhauled.

Jim Robinson, pilot for Mid-Western Instruments Co., Tulsa, Okla., had his plane in for overhaul, and Walter E. Bullington, pilot for the Tulsa Refinery Engineering Co. had his Lycoming in for DAI overhaul.

- Bern Finke, newly-appointed captain of Sun Oil Co.'s "Flagship," had his plane at Reading Aviation Service, Inc., recently, for a 100-hr inspection. Bern succeeded to flying duties of Ray Higgens who now administers Sun's 15-plane fleet.

- Executive Aircraft Service, Inc., Dallas, Tex., did 100-hr inspections, miscellaneous repairs, and relicensing recently on both of S. W. Richardson's DC-3's, flown in from Fort Worth by Ed Armstrong and Jim Smith.

Lecuno Oil Corp., Marshall, Tex., sent Gene Morscheck and Harold Gooden to Executive with their *Lodestar* to have airframe overhaul, dual fuel system, integrated flight system, and exterior paint job.

The *Lodestar* of the Wyandotte Chemicals Corp., Wyandotte, Mich., was flown to Executive Aircraft by pilot Charles Schenck for 100-hr inspection, fuel-tank seal, and relicensing. And, Pan-Am Southern Corp., New Orleans, sent their *Lodestar* in with pilots Cliff Conrad and Don Butler for 100-hr inspection, miscellaneous repairs and a fuel-tank seal.

- E. L. Cord's Beechcraft was at Grand Central Aircraft Co., Glendale, Calif., recently for new interior, new radio gear, and miscellaneous work.

- Frank Tranter, pilot for North American Van Lines' new *Super Twin*, is back in Leeward Aeronautical Service's hangar after an extensive U. S. tour.

- Hugh Haas, of O. R. Burden Construction Co., Tulsa, has added Collins 17L-4 and 51X-1, 360-channel communications groups to the company's Beech D-18, along with dual ARC omni. Installations by Aerotron Radio Co., Tulsa.

- Saint Louis Insurance Group's newly-purchased Aero Commander has been equipped with a Flite-Tronics MB-3 marker-beacon receiver.

- Gus Rahm and Dick Dyer brought Schenley Industries' Super-92 DC-3 to Remmert-Werner, St. Louis, for a Bendix RDR-1B1 airframe radar with mapping and beacon facilities, and hinged radome with separately-hinged scanner.

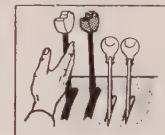
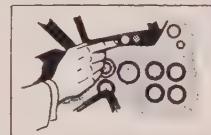
- Dale B. Olson brought Aurora Gasoline Co.'s D-18 to Spartan Aviation recently for double-engine overhaul, propeller and accessory overhaul, seating arrangement change, and new hot-enamel exterior paint job.



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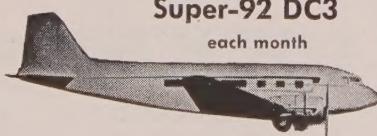
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local commerce and industry.

An aeronautical-economic study report covers the basic economic factors pertaining to industrial, commercial, and residential land use concentrations and building growth. It determines or confirms the community's classification as a *marketing, institutional, industrial or balanced center* and proposes aircraft landing facilities suitable for a community of that type and size. The air transportation activity that would be beneficial to the community is considered. Does the town need trunk or feeder airline service with scheduled air mail and air cargo, or will it be adequately served by a good landing place for modern business aircraft? (NBAA Airport Letter.)

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Business-Aircraft Dividends

(Continued from page 21)

between our plants, which happily, are within a hundred miles of our offices, and all in Georgia."

Barwick also pointed out that the DC-3 was not for his personal transportation. When he is not "on the road," the airplane is used constantly to bring in buyers, distributors, and salesmen to the home office. As an example, he stated that during the past year some 1,500 buyers, distributors and salesmen had visited the Barwick plants.

"We are firm believers in the value of this more intimate type relation with people," Barwick said. "It may be hard to see a busy store buyer or an important distributor under the normal pressures in his own office." One appealing method, he added, was to tell them the Barwick planes were at their disposal in New York or Chicago on a certain date, and that they could visit the plants, discuss problems—even get a little golf in—and be on their way back to New York or Chicago in time for dinner the following day.

"We believe in it," Barwick stressed, "it pays off. It comes under the head of good customer relations and pre-selling."

Barwick officials are firmly convinced that airplanes today are essential tools of industry, though "some corporations are still so sensitive to the tendency of stockholders to equate planes with yachts that they will not put their names on their aircraft."

On the subject of the value, convenience

and flexibility of a company airplane, Barwick is strong in his views since he speaks from first-hand experience. He was quick to recognize, as he puts it, that "business has sprouted wings because it had to . . . a company plane saves an executive 30% to 50% travel time. In it, he can hop around the country and still be home on weekends, an important factor in keeping a key man if his job requires almost continuous travel."

Barwick Mills first took to the air in 1953 when they purchased a Lockheed *Lodestar*. This plane was outgrown in 1955 and a larger DC-3 was purchased after the company was completely "sold" on the essentiality of an airplane for expanding commercial interests and its time-saving value to top officials, distributors and customers. NBAA representative and Barwick's chief pilot Carl Forrester, Jr. and his first pilot W. L. "Bill" Bersch, are old hands in business flying with many thousands of hours under their seat belts. Forrester holds an Air Transport Rating and Bersch has a commercial certificate with an instrument rating. In handling the maintenance end of the company operations, chief mechanic F. T. Harwell, Jr., is kept quite busy with the heavy flight schedule of the DC-3.

One needs only to review the revealing summary of the Barwick Mills aircraft operations for the period July 1, 1953 through December 30, 1955, to perceive the ever-increasing utilization of their airplanes in the pursuit of greater sales coverage, better coordination between plants, frequent dis-



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	1955 58:20	61	11,092	29,209
February	1954 75:55	80	15,737	39,744
	1955 28:00	28	4,876	12,604
March	1954 44:50	41	8,444	14,549
	1955 92:00	178	16,626	87,074
April	1954 71:25	98	13,640	22,648
	1955 55:30	158	9,799	51,418
May	1954 73:50	132	15,494	59,502
	1955 68:10	158	12,133	65,323
June	1954 60:15	91	12,256	31,789
	1955 65:49	180	11,891	84,251
July	1953 26:56	40	5,368	16,104
	1954 79:30	86	16,742	41,446
	1955 72:50	189	13,744	152,031
August	1953 36:35	45	7,297	21,891
	1954 31:00	37	6,105	18,456
	1955 23:35	34	4,577	21,040
September	1953 31:00	42	5,735	17,205
	1954 64:10	70	12,208	29,914
	1955 37:40	49	7,726	20,674
October	1953 68:55	130	14,635	41,803
	1954 67:10	110	13,248	34,120
	1955 79:24	199	14,026	85,250
November	1953 55:40	105	10,709	45,819
	1954 63:05	70	11,970	28,893
	1955 54:00	76	8,946	21,263
December	1953 65:50	71	13,037	32,754
	1954 37:45	64	7,343	20,087
	1955 35:00	41	6,330	18,827
Sub-Total	1953 284:56	433	56,781	175,576 (6 mo.)
	1954 714:35	948	141,100	375,812
	1955 670:18	1,351	121,766	648,964
TOTALS	1,669:49	2,732	319,647	1,200,352

Flite-Tronics DS-5 Audio Isolation Amplifier

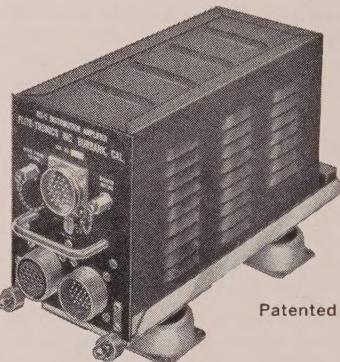


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tributor and buyer contacts. The accompanying flight log covers only the totals of the previously-owned *Lodestar* and the present DC-3.

As a most active member of the growing roster of company aircraft operators, Barwick Mills, their management, their pilots and mechanics, and staff personnel are all helping to point the way to broader horizons in the field of business flying.

Since time is still the most important factor today to most business executives, each year thousands more are heading skyward in company-operated aircraft. Faced with increased competition, the necessity for compressing complex staff duties, contacts, conferences, field trips, normally in an eight-hour period each day, the businessman must necessarily make his time as productive as possible.

To beat the clock and make field trips pay profitable dividends, officials of large and small organizations are finding that the modern answer for stepping-up productive hours from two to four times depends upon direct aircraft transportation. They also have learned that users of surface transportation are losing some 50 to 60% of their business potential, are subject to more physical wear and tear, frustrating changes and delays in schedules, longer periods away from the main office, and less time at home with the family.

Perhaps your company staff does not make extensive field trips like the executives and staff of Barwick Mills. If so, this article may be of only minor interest. On the other hand, if you have high-salaried executives sitting day after day in trains, driving autos over long distances, or combining these forms of transportation with airline schedules that do not go directly to the desired destination, then this case history could be of considerable interest and importance.

It may well prove a turning point in the future growth and progress of your company and open new opportunities for business achievement. Barwick Mills certainly affords a shining example of how to win distributors and influence customers with a company airplane.



Birmingham Man Gets His 24th Airplane

Birmingham, Ala. Harold F. Wood, head of Wood Chevrolet here, recently took delivery on a new Piper Apache, the 24th airplane that he has owned.

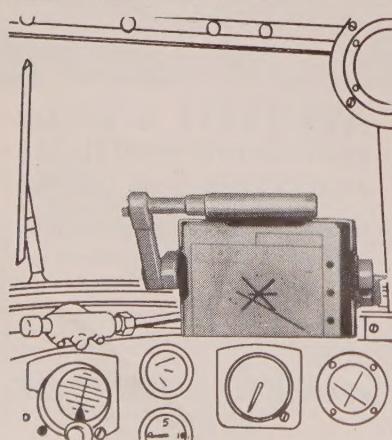
Delivery was made at the Piper Aircraft Corp. plant, Lock Haven, Pa., by J. W. Miller, the company's sales manager.

Mr. Wood has been an active private pilot for many years, and is a past president of the Sportsman's Pilot Association.

New Corporate Hangar At MacArthur Airport

Islip, L.I., N.Y. Airport Industries, Inc., at MacArthur Airport here, has completed the first corporate-aircraft hangar in the airport's hangar-building program.

The hangar, a 7,000 sq-foot, all-metal building, will be occupied by Long Island Airways, Inc.



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